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- Strategies for Taking the Paper-Based or Computerized GRE

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- **Review questions...**
  from 27 actual GRE tests.
- **Review strategies...**
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ETS is best known as the developer of admissions testing programs for college and graduate study, including the College Board's Scholastic Assessment Tests (SAT), the Test of English as a Foreign Language (TOEFL), the Graduate Record Examinations (GRE), and the Graduate Management Admission Test (GMAT).

This book has been published by Educational Testing Service for the Graduate Record Examinations Board, which is committed to serving those interested in graduate education.

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This is one of the official GRE practice books, the only publications that contain actual GRE tests administered world-wide. The books have been published by Educational Testing Service for the Graduate Record Examinations Board, which is committed to serving those interested in graduate education.

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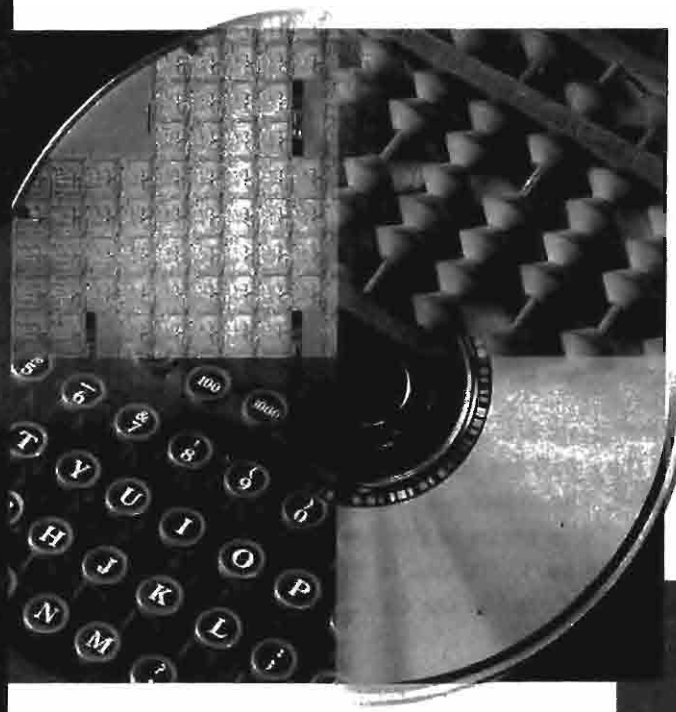

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The Graduate Record Examinations® Program offers a General Test measuring developed verbal, quantitative, and analytical abilities and Subject Tests measuring achievement in the following 16 fields:

Biochemistry, Cell and Molecular Biology	Economics	Literature in English	Political Science
Biology	Education	Mathematics	Psychology
Chemistry	Engineering	Music	Sociology
Computer Science	Geology	Physics	
	History		

The tests are administered by Educational Testing Service under policies determined by the Graduate Record Examinations Board, an independent board affiliated with the Association of Graduate Schools and the Council of Graduate Schools.

Practice materials are developed to familiarize examinees with the types of questions they will see on actual GRE tests and to help them estimate their performance. The materials consist of previously administered paper-and-pencil tests. Differences in the number of items and the actual format of the test may be found. Questions in this practice book are presented in a different format from that used in the Computer-Based Testing (CBT) Program.

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IMPORTANT

Please Read • Please Read • Please Read • Please Read

This publication contains reprints of GRE General Test questions written between 1980 and 1992 and used on tests administered between 1984 and 1994. For this reason, some of the material covered in the questions may be dated. For example, one question may refer to a political entity (such as the Soviet Union) that no longer exists. Another question may refer to a rapidly changing technology in a way that was correct in the early 1980's, but not now. In addition, ETS has revised and updated its standards and guidelines for test questions several times since 1980, so some questions may not meet current standards. Questions in this book that are marked with an asterisk do not meet current ETS standards and would not appear in GRE tests administered today.

The GRE Program is currently investigating the feasibility of re-using questions that have been published in the *Practicing to Take the GRE General Test* series (including the ones in this book). As part of that investigation, you may see questions from this book on a test you take. Any questions used in exactly the same form as they appear in this book will not be scored, but will be used only as part of that research effort. If current investigations support a decision to use published items in the part of the test that counts toward your score, a notice to that effect will be widely distributed.

The scored portion of the test you take may include questions that are modified versions of published questions. Some modifications are substantial; others are less apparent. Thus, even if a question appears to be similar to a question you have seen in this book, it may in fact be a different question and may also have a different correct answer. You can be assured of doing your best on the test you take by carefully answering each question as it appears in your test, whether or not you think you have seen it before.

Description of the General Test

The GRE General Test measures certain developed verbal, quantitative, and analytical abilities that are important for academic achievement. Thus, the test necessarily reflects the opportunities and efforts that have contributed to the development of those abilities.

The General Test is only one of several means of evaluating likely success in graduate school. It is not intended to measure inherent intellectual capacity or intelligence. Neither is it intended to measure creativity, motivation, perseverance, or social worth. The test does, however, make it possible to compare students with different backgrounds. A GRE score of 500, for example, has the same meaning whether earned by a student at a small, private liberal arts college or by a student at a large public university.

Because several different forms (or editions) of the test are in active use at any one time, not all students receive the same test edition. However, all editions measure the same skills and meet the same specifications for content and difficulty. The scores from different editions are made comparable to one another by a statistical procedure known as equating. This procedure makes it possible to assure that all reported scores of a given value denote the same level of developed ability regardless of which edition of the test is taken.

Since students have wide-ranging backgrounds, interests, and skills, the *verbal sections* of the General Test use questions from diverse areas of experience. The areas tested range from the activities of daily life to broad categories of academic interest such as the sciences, social studies, and the humanities. The content areas included in the *quantitative sections* of the test are arithmetic, algebra, geometry, and data analysis. These are content areas usually studied in high school. Questions in the *analytical sections* measure reasoning skills developed in virtually all fields of study. No formal training in logic or methods of analysis is needed to do well in these sections.

Are GRE Tests Fair?

ETS has designed two procedures for ensuring the fairness of its tests. The first is a sensitivity review process to ensure that tests reflect the multicultural nature of United States society and that test questions do not contain language that perpetuates stereotypes, offends members of a particular group, or might distract test takers from the task at hand. On the basis of the sensitivity review, any potential test material that might offend people on the basis of their age, sex, disability, ethnic group, or race is eliminated.

The second procedure is called Differential Item Functioning (DIF) analysis. DIF is a statistical procedure that identifies test questions on which one group of test takers (e.g., male) outperforms another group (e.g., female) in spite of similar levels of knowledge and skills as determined by their performance on the test as a whole. Questions that prove unequally difficult for one of the groups are scrutinized for bias by a specially trained committee to determine whether the questions should be eliminated from scoring.

The GRE Program encourages test takers to report concerns about specific test questions directly to the test center supervisor or to the GRE Program immediately following the test administration. Subject matter specialists will review the question and eliminate it from scoring if potential bias is determined. The test specialists will respond in writing to the examinee. If the response does not resolve the examinee's concern, the examinee can pursue the matter within ETS.

Test-Taking Strategies

General Tips

In preparing to take the General Test you should become thoroughly familiar with the directions provided in the practice General Test sections in this book. You have probably taken tests that contain questions similar to those found in the verbal and quantitative sections of the General Test. The question types found in the analytical section may be less familiar. You should review the directions for those questions and work through some of the practice questions, particularly if you have not previously encountered questions of this type. The same is true for any of the verbal or quantitative question types that are not familiar to you. Research suggests that practicing unfamiliar question types results in improved performance and decreases the likelihood of inaccurately low scores. You should still read the directions for each group of questions carefully during the actual test administration.

Test-taking strategies appropriate for taking the General Test with paper and pencil are different from those appropriate for taking the computer-adaptive General Test.

Paper-Based Strategies

When taking the test with paper and pencil, you are free, within any section, to skip questions that you might have difficulty answering and to come back to them later during the time provided for work on that section. You may also change the answer to any question you recorded on the answer sheet by erasing it completely and filling in the oval corresponding to your desired answer for that question.

Each of your scores will be determined by the number of questions for which you select the best answer from the choices given. Questions for which you mark no answer or more than one answer are not counted in scoring. Nothing is subtracted from a score if you answer a question incorrectly. Therefore, to maximize your scores on the paper-based test, it is better for you to guess at an answer than not to respond at all.

Work as rapidly as you can without being careless. *This includes checking frequently to make sure you are marking your answers in the appropriate*

rows on your answer sheet. Since no question carries greater weight than any other, do not waste time pondering individual questions you find extremely difficult or unfamiliar.

You may find it advantageous to go through a section of the General Test a first time quite rapidly, stopping only to answer those questions of which you are confident. Then go back and answer the questions that require greater thought, concluding with the very difficult questions, if you have time.

During the actual administration of the General Test, you may work *only* on the section the supervisor designates and only for the time allowed. You may *not* go back to an earlier section of the test after the supervisor announces, "Please stop work" for that section. The supervisor is authorized to dismiss you from the center for doing so. All answers must be recorded on your answer sheet. Answers recorded in your test booklet will not be counted. Given the time constraints, you should avoid waiting until the last five minutes of a test administration to record answers on your answer sheet.

Some sections of the General Test contain test questions with only four response options (A through D) or with only two response options (A and B). All GRE answer sheets for the paper-based test contain response positions for five responses (A through E). Therefore, if an E response is marked for a four-option question, it will be ignored. An E response for a four-option question is treated the same as no response (omitted).

CAT Strategies

Changes Effective October 1, 1996

Prior to October 1, 1996, CAT examinees who did not answer a minimum number of questions in a section (about 80 percent), received an NS (No Score) for that section. **That policy has changed.** Beginning October 1, 1996, all examinees will receive a test score, regardless of the number of questions answered.

Your score on the CAT will now be dependent on how well you do on the questions presented as well as on the number of questions you answer. **Therefore, it is to your advantage to answer every question even if you have to guess to complete the test.**

NOTE: For tests taken before October 1, 1996, the CAT strategies in the 1995-96 *GRE General Test Descriptive Booklet* and the CAT scoring information in the 1995-96 *GRE Bulletin* are applicable.

1. Use the tutorial to learn how to interact with the computer.

- The tutorial teaches you how to use the features of the computer system to your advantage. You will find the system very easy to use, even if you have no prior computer experience.
- The ability to type is not necessary to take the computer-adaptive test (CAT). The tutorial shows you how to use a mouse to click on the appropriate area of your screen.
- Take all the time you need with the tutorial *before* you begin the test — even if you feel quite comfortable using computers; there might be differences between the adaptive test software and the software you normally use.

- You may return to any part of the tutorial, even after you begin work on the test sections, by clicking on the "Help" box at the bottom of your screen. However, any time you spend on the tutorials *after* you have begun a test section will reduce the amount of time available for work on that section.
- Some questions, graphs, or passages are too large to appear completely on the computer screen. In that case a "scroll bar" appears to the right of the material and the word "Beginning" appears on the information line at the top of the screen. These are your cues to scroll for more information.
- During the tutorial, make sure you learn how to scroll both slowly (line by line) and quickly (page by page) so that you can move to areas of text at the speed you desire.

2. Try to answer all of the questions in each section.

- The directions at the beginning of each test section specify the total number of questions in the section and the time allowed for the section. The number of questions answered is incorporated into the calculation of scores. Therefore, it is to your advantage to answer ALL of the questions.
- You should closely monitor your time so that you are able to carefully consider each question.
- If you are running out of time and there are still unanswered questions, it is to your advantage to guess at those last questions rather than to leave them unanswered.

The table that follows shows a typical CAT. The number of CAT questions you receive in a measure may differ slightly from the typical CAT. If so, the time limit for that CAT measure may be adjusted so that the average time available per question will be similar to the typical CAT. In addition to the three CAT sections appearing in every test, the table illustrates that pretest and/or research sections may be included.

Typical CAT Sections

Section	Number of Questions	Time
Verbal	30	30 Min.
Quantitative	28	45 Min.
Analytical	35	60 Min.
Unidentified Pretest Section*		
Pretest	Varies	Varies
Identified Research Section**		
Research	Varies	Varies

***UNIDENTIFIED PRETEST SECTION:**

- Questions or sections are being pretested for possible use in future tests.
- Answers will not count towards scores.
- Section not identified as a pretest section.
- If included in your test, the pretest section can appear in any position in the test.

****IDENTIFIED RESEARCH SECTION:**

- Questions or sections are for the purpose of ETS research.
- Answers will not count toward scores.
- If included in your test, this section will appear last in the test.
- This section may require essay or paragraph writing, inserting data into a table, or manipulating a graph.

3. Maximize your score through effective time management.

- Answer as many questions as you can in each section.
- Check the time remaining regularly to be sure you are making good progress through the test. The amount of time remaining for each section is displayed on the information line at the top of the screen. Clicking on the "Time" box at the bottom of the screen will turn the time information off or back on again.
- Once you begin a section, section time runs continuously until you leave the section. This is true even if you click on "Time" to hide the time information or click on "Help" in order to review section directions or any part of the tutorial.
- You might want to replenish your supply of scratch paper during each one-minute break between each test section. You will be informed by an on screen message of the availability of a 10-minute break midway through the testing session. Section timing will *not* stop if you take an unscheduled break.

4. Answer each question in the order it is presented to you.

- You must answer the question that appears on your screen before moving on to the next question. Once you have answered a question and confirmed your response, you cannot return to it.

5. Click on the appropriate answer.

- Answer each question by clicking on the oval next to the answer choice you select. You can also answer a question by clicking on any part of the text of an answer choice. Complete your answer by clicking on "Next" and then "Answer Confirm."
- You can change your answer any time before confirming it by clicking on a different answer choice.

6. Use effective strategies when guessing at answers.

- If you are unable to continue your test because you are stuck on a question that is too difficult, eliminate as many answer choices as possible and then guess. You will then be able to continue on to the next question.
- Random guessing throughout the test could reduce your score. On the other hand, if you are running out of time and there are still unanswered questions, it is to your advantage to guess at those last questions rather than to leave them unanswered.
- Don't worry about getting too many hard questions as the result of a lucky guess, or too many easy questions as the result of an unlucky one. The computer will adjust its selection to guide you back to questions at an ability level appropriate for you.

7. Understand the implications of exiting a section or quitting the test.

- Once you exit a section, you cannot return to it.
- Click on the "Test Quit" box at the bottom of your screen *only* if you decide to end your testing session. If you quit the test, you will not receive a score for any section, even for those sections you have already completed.

- If you mistakenly click on "Test Quit" or "Section Exit," you will be given the opportunity to reverse or confirm your decision.
- You may take the CAT no more than one time within any 60-day period. This is true even if you ended your testing session by clicking on "Test Quit." You may take the paper-based General Test at any or all of the announced administration dates.

How Is the CAT Scored?

In a paper-based version of the GRE General Test, examinees receive one raw score point for each question they answer correctly, whether the question is easy or hard. An examinee's score is based only on the number of questions answered correctly.

In the GRE CAT, an examinee's score is based on the performance on the particular questions that are presented by the design of the test. The test design factors that influence which questions you will be presented include: 1) the difficulty level of the questions answered correctly and incorrectly, 2) question types, and 3) coverage of specific content. This allows the computer to give you questions that are appropriate for you and to ensure that the overall test content meets the specifications for the General Test. In the GRE CAT, the examinee gets more credit for correctly answering a hard question than for correctly answering an easy question. Your final score will reflect the overall level of knowledge you have demonstrated for the content areas being tested.

The computer does not always select a harder question when you answer a question correctly and an easier one when you miss it. This is because the test design includes several factors other than how hard the questions are.

General Test Sample Questions with Explanations

The sample questions that follow are organized by content category and represent the types of questions included in the General Test. The purpose of these questions is to provide some indication of the range of topics covered in the test as well as to provide some additional questions for practice purposes. **These questions do not represent either the length of the actual test or the proportion of actual test questions within each of the content categories.**

VERBAL ABILITY

The verbal ability measure is designed to test one's ability to reason with words in solving problems. Reasoning effectively in a verbal medium depends primarily upon the ability to discern, comprehend, and analyze relationships among words or groups of words and within larger units of discourse such as sentences and written passages.

The verbal measure consists of four question types: *analogies, antonyms, sentence completions,* and *reading comprehension* sets. The examples of verbal questions in this section do not reflect precisely the difficulty range of the verbal measure.

ANALOGIES

Analogy questions test the ability to recognize the relationship that exists between the words in a word pair and to recognize when two word pairs display parallel relationships. To answer an analogy question, one must formulate the relationship between the words in the given word pair and then must identify the answer choice containing words that are related to one another in most nearly the same way. Some examples of relationships that might be found in analogy questions are relationships of kind, size, spatial contiguity, or degree.

Some approaches that may be helpful in answering analogy questions:

- Before looking at the answer choices, try to establish a precise relationship between the words in the given pair. It is usually helpful to express that relationship in a phrase or sentence. Next, look for the answer choice with the pair of words whose relationship is closest to that of the given pair and can be expressed in a similar fashion.
- Occasionally, more than one of the answer choices may seem at first to express a relationship similar to that of the given pair. Try to state the relationship more precisely or identify some aspect of the relationship between the given pair of words that is paralleled in only *one* choice pair.
- Remember that a single word can have several different meanings. Check to be sure you have not overlooked a possible second meaning for one of the words.
- *Never* decide on the best answer without reading *all* the answer choices.
- Practice recognizing and formulating relationships between word pairs. You can do this with the following sample questions and with the analogy questions in the practice General Test sections in this booklet.

Directions: **In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.**

1. COLOR : SPECTRUM : : **(A) tone : scale (B) sound : waves (C) verse : poem (D) dimension : space (E) cell : organism**

The relationship between *color* and *spectrum* is not merely that of part to whole, in which case (E) or even (C) might be defended as correct. A *spectrum* is made up of a progressive, graduated series of *colors*, as a *scale* is of a progressive, graduated sequence of *tones*. Thus, (A) is the correct answer choice. In this instance, the best answer must be selected from a group of fairly close choices.

2. HEADLONG : FORETHOUGHT : :
(A) barefaced : shame
(B) mealymouthed : talent
(C) heartbroken : emotion
(D) levelheaded : resolve
(E) singlehanded : ambition

The difficulty of this question probably derives primarily from the complexity of the relationship between *headlong*

and *forethought* rather than from any inherent difficulty in the words. Analysis of the relationship between *headlong* and *forethought* reveals the following: an action or behavior that is *headlong* is one that lacks *forethought*. Only answer choice (A) displays the same relationship between its two terms.

ANTONYMS

Although antonym questions test knowledge of vocabulary more directly than do any of the other verbal question types, the purpose of the antonym questions is to measure not merely the strength of one's vocabulary but also the ability to reason from a given concept to its opposite. Antonyms may require only rather general knowledge of a word, or they may require one to make fine distinctions among answer choices. Antonyms are generally confined to nouns, verbs, and adjectives; answer choices may be single words or phrases.

Some approaches that may be helpful in answering antonym questions:

- Remember that you are looking for the word that is the most nearly *opposite* to the given word; you are *not* looking for a synonym. Since many words do not have a precise opposite, you must look for the answer choice that expresses a concept *most nearly* opposite to that of the given word.
- In some cases more than one of the answer choices may appear at first to be opposite to the given word. Questions that require you to make fine distinctions among two or more answer choices are best handled by defining more precisely or in greater detail the meaning of the given word.
- It is often useful, in weighing answer choices, to make up a sentence using the given word or words. Substituting the answer choices in the phrase or sentence and seeing which best "fits," in that it reverses the meaning or tone of the sentence or phrase, may help you determine the best answer.
- Remember that a particular word may have more than one meaning.
- Use your knowledge of root, prefix, and suffix meanings to help you determine the meanings of words with which you are not entirely familiar.

Directions: **Each question below consists of a word printed in capital letters followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly *opposite* in meaning to the word in capital letters. Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.**

3. DIFFUSE : **(A) concentrate (B) contend (C) imply (D) pretend (E) rebel**

The best answer is (A). *Diffuse* means to permit or cause to spread out; only (A) presents an idea that is in any way opposite to *diffuse*.

4. MULTIFARIOUS :
(A) deprived of freedom
(B) deprived of comfort
(C) lacking space (D) lacking stability
(E) lacking diversity

Multifarious means having or occurring in great variety, so the best answer is (E). Even if one is not entirely familiar with the meaning of *multifarious,* it is possible to use the clue provided by "multi-" to help find the right answer to this question.

SENTENCE COMPLETIONS

The purpose of the sentence completion questions is to measure the ability to recognize words or phrases that both logically and stylistically complete the meaning of a sentence. In deciding which of five words or sets of words can best be substituted for blank spaces in a sentence, one must analyze the relationships among the component parts of the incomplete sentence. One must consider each answer choice and decide which completes the sentence in such a way that the sentence has a logically satisfying meaning and can be read as a stylistically integrated whole.

Sentence completion questions provide a context within which to analyze the function of words as they relate to and combine with one another to form a meaningful unit of discourse.

Some approaches that may be helpful in answering sentence completion questions:

- Read the entire incomplete sentence carefully before you consider the answer choices. Be sure you understand the ideas expressed and examine the sentence for possible indications of tone (irony, humor, and the like).
- Before reading the answer choices, you may find it helpful to fill in the blanks with a word or words of your own that complete the meaning of the sentence. Then examine the answer choices to see if any of them parallels your own completion of the sentence.
- Pay attention to grammatical clues in the sentence. For example, words like *although* and *nevertheless* indicate that some qualification or opposition is taking place in the sentence, whereas *moreover* implies an intensification or support of some idea in the sentence.

- If a sentence has two blanks, be sure that *both* parts of your answer choice fit logically and stylistically into the sentence.
- When you have chosen an answer, read the complete sentence through to check that it has acquired a logically and stylistically satisfying meaning.

Directions: **Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that *best* fits the meaning of the sentence as a whole.**

5. Early ------- of hearing loss is ------- by the fact that the other senses are able to compensate for moderate amounts of loss, so that people frequently do not know that their hearing is imperfect.
(A) discovery . . indicated
(B) development . . prevented
(C) detection . . complicated
(D) treatment . . facilitated
(E) incidence . . corrected

The statement that the other senses compensate for partial loss of hearing indicates that the hearing loss is not *prevented* or *corrected*; therefore, choices (B) and (E) can be eliminated. Furthermore, the ability to compensate for hearing loss certainly does not facilitate the early *treatment* (D) or the early *discovery* (A) of hearing loss. It is reasonable, however, that early *detection* of hearing loss is *complicated* by the ability to compensate for it. The best answer is (C).

6. The ------- science of seismology has grown just enough so that the first overly bold theories have been -------.
(A) magnetic . . accepted
(B) fledgling . . refuted
(C) tentative . . analyzed
(D) predictive . . protected
(E) exploratory . . recalled

At first reading, there may appear to be more than one answer choice that "makes sense" when substituted in the blanks of the sentence. (A), (C), and (D) can be dismissed fairly readily when it is seen that *accepted, tentative,* and *protected* are not compatible with *overly bold* in the sentence. Of the two remaining choices, (B) is superior on stylistic grounds: theories are not *recalled* (E), and *fledgling* (B) reflects the idea of growth present in the sentence.

READING COMPREHENSION

The purpose of the reading comprehension questions is to measure the ability to read with understanding, insight, and discrimination. This type of question explores the examinee's ability to analyze a written passage from several perspectives, including the ability to recognize both explicitly stated elements in the passage and assumptions underlying statements or arguments in the passage as well as the implications of those statements or arguments. Because the written passage upon which reading comprehension questions are based presents a sustained discussion of a particular topic, there is ample context for analyzing a variety of relationships; for example, the function of a word in relation to a larger segment of the passage, the relationships among the various ideas in the passage, or the relation of the author to his or her topic or to the audience.

There are six types of reading comprehension questions. These types focus on (1) the main idea or primary purpose of the passage; (2) information explicitly stated in the passage; (3) information or ideas implied or suggested by the author; (4) possible applications of the author's ideas to other situations, including the identification of situations or processes analogous to those described in the passage; (5) the author's logic, reasoning, or persuasive techniques; and (6) the tone of the passage or the author's attitude as it is revealed in the language used.

In each edition of the General Test, there are two relatively long reading comprehension passages, each providing the basis for answering six or seven questions, and two relatively short passages, each providing the basis for answering four or five questions. The four passages are drawn from four different subject matter areas: the humanities, the social sciences, the biological sciences, and the physical sciences.

Some approaches that may be helpful in answering reading comprehension questions:

- Since reading passages are drawn from many different disciplines and sources, you should not expect to be familiar with the material in all the passages. However, you should not be discouraged by encountering material with which you are not familiar; questions are to be answered on the basis of the information provided in the passage, and you are not expected to rely on outside knowledge, which you may or may not have, of a particular topic. You may, however, want to do last a passage that seems to you particularly difficult or unfamiliar.
- Whatever strategy you choose, you should analyze the passage carefully before answering the questions. As with any kind of close and thoughtful reading, you should be sensitive to clues that will help you understand less explicit aspects of the passage. Try to

separate main ideas from supporting ideas or evidence; try also to separate the author's own ideas or attitudes from information he or she is simply presenting. It is important to note transitions from one idea to the next and to examine the relationships among the different ideas or parts of the passage. For example, are they contrasting? Are they complementary? You should consider both the points the author makes and the conclusions he or she draws and also how and why those points are made or conclusions drawn.

- Read each question carefully and be certain that you understand exactly what is being asked.
- *Always* read all the answer choices before selecting the best answer.
- The best answer is the one that most accurately and most completely answers the question being posed. Be careful not to pick an answer choice simply because it is a true statement; be careful also not to be misled by answer choices that are only partially true or only partially satisfy the problem posed in the question.
- Answer the questions on the basis of the information provided in the passage and do not rely on outside knowledge. Your own views or opinions may sometimes conflict with the views expressed or the information provided in the passage; be sure that you work within the context provided by the passage. You should not expect to agree with everything you encounter in reading passages.

Directions: **The passage is followed by questions based on its content. After reading the passage, choose the best answer to each question. Answer all questions following the passage on the basis of what is *stated* or *implied* in the passage.**

Picture-taking is a technique both for annexing the objective world and for expressing the singular self. Photographs depict objective realities that already exist, though only the camera can disclose them. And they depict an individual photographer's temperament, discovering itself through the camera's cropping of reality. That is, photography has two antithetical ideals: in the first, photography is about the world and the photographer is a mere observer who counts for little; but in the second, photography is the instrument of intrepid, questing subjectivity and the photographer is all.

These conflicting ideals arise from a fundamental uneasiness on the part of both photographers and viewers of photographs toward the aggressive component in "taking" a picture. Accordingly, the ideal of a photographer as observer is attractive because it implicitly denies that picture-taking is an aggressive act. The issue, of course, is not so clear-cut. What photographers do cannot be characterized as simply predatory or as simply, and essentially, benevolent. As a consequence, one ideal of picture-taking or the other is always being rediscovered and championed.

An important result of the coexistence of these two ideals is a recurrent ambivalence toward photography's means. Whatever the claims that photography might make to be a form of personal expression on a par with painting, its originality is inextricably linked to the powers of a machine. The steady growth of these powers has made possible the extraordinary informativeness and imaginative formal beauty of many photographs, like Harold Edgerton's high-speed photographs of a bullet hitting its target or of the swirls and eddies of a tennis stroke. But as cameras become more sophisticated, more automated, some photographers are tempted to disarm themselves or to suggest that they are not really armed, preferring to submit themselves to the limits imposed by premodern camera technology because a cruder, less high-powered machine is thought to give more interesting or emotive results, to leave more room for creative accident. For example, it has been virtually a point of honor for many photographers, including Walker Evans and Cartier-Bresson, to refuse to use modern equipment. These photographers have come to doubt the value of the camera as an instrument of "fast seeing." Cartier-Bresson, in fact, claims that the modern camera may see too fast.

This ambivalence toward photographic means determines trends in taste. The cult of the future (of faster and faster seeing) alternates over time with the wish to return to a purer past — when images had a handmade quality. This nostalgia for some pristine state of the photographic enterprise is currently widespread and underlies the present-day enthusiasm for daguerreotypes and the work of forgotten nineteenth-century provincial photographers. Photographers and viewers of photographs, it seems, need periodically to resist their own knowingness.

7. According to the passage, the two antithetical ideals of photography differ primarily in the

(A) value that each places on the beauty of the finished product

(B) emphasis that each places on the emotional impact of the finished product

(C) degree of technical knowledge that each requires of the photographer

(D) extent of the power that each requires of the photographer's equipment

(E) way in which each defines the role of the photographer

The best answer to this question is (E). Photography's two ideals are presented in lines 7-12. The main emphasis in the description of these two ideals is on the relationship of the photographer to the enterprise of photography, with the photographer described in the one as a passive observer and in the other as an active questioner. (E) identifies this key feature in the description of the two ideals — the way in which each ideal conceives or defines the role of the photographer in photography. (A) through (D) present aspects of photography that are mentioned in the passage, but none of these choices represents a primary difference between the two ideals of photography.

8. According to the passage, interest among photographers in each of photography's two ideals can best be described as

(A) rapidly changing

(B) cyclically recurring

(C) steadily growing

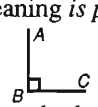
(D) unimportant to the viewers of photographs

(E) unrelated to changes in technology

This question requires one to look for comments in the passage about the nature of photographers' interest in the two ideals of photography. While the whole passage is, in a sense, about the response of photographers to these ideals, there are elements in the passage that comment specifically on this issue. Lines 22-24 tell us that the two ideals alternate in terms of their perceived relevance and value, that each ideal has periods of popularity and of neglect. These lines support (B). Lines 25-27 tell us that the two ideals affect attitudes toward "photography's means," that is, the technology of the camera; (E), therefore, cannot be the best answer. In lines 52-56, attitudes toward photographic means (which result from the two ideals) are said to alternate over time; these lines provide further support for (B). (A) can be eliminated because, although the passage tells us that the interest of photographers in each of the ideals fluctuates over time, it nowhere indicates that this fluctuation or change is rapid. Nor does the passage say anywhere that interest in these ideals is growing; the passage *does* state that the powers of the camera are steadily growing (line 31), but this does not mean that interest in the two ideals is growing. Thus (C) can be eliminated. (D) can be eliminated because the passage nowhere states that reactions to the ideals are either important or unimportant to viewers' concerns. Thus (B) is the best answer.

QUANTITATIVE ABILITY

The quantitative sections of the General Test are designed to measure basic mathematical skills, understanding of elementary mathematical concepts, and ability to reason quantitatively and to solve problems in a quantitative setting.

In general, the mathematics required does not extend beyond that usually covered in high school. It is expected that examinees will be familiar with conventional symbolism, such as $x < y$ (x is less than y), and $x \neq y$ (x is not equal to y), $\parallel$ (meaning *is parallel to*), $\perp$ (meaning *is perpendicular to*), and  (meaning that $\angle ABC$ is a right angle). Nonstandard notation is used only when it is explicitly defined in a particular question.

A question may be posed in either English or metric units of measure. Neither the knowledge required for converting units in one system to units in another system, nor the ability to convert from one unit to another in the same system, is tested. If an answer to a question is expected to be in a unit of measure different from the unit in which the question is posed, a relationship between the units is provided unless the relationship is a common one, such as minutes to hours.

The following information on numbers and figures applies to all questions in the quantitative sections.

Numbers:

All numbers used are real numbers.

Figures:

Position of points, angles, regions, etc. can be assumed to be in the order shown, and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems not by estimating sizes by sight or by measurement, but by using your knowledge of mathematics.

The questions in the quantitative sections include four broad content areas: *arithmetic, algebra, geometry,* and *data analysis.*

ARITHMETIC

Questions classified as *arithmetic* include those involving the following topics: arithmetic operations (addition, subtraction, multiplication, division, and powers) on real numbers, operations on radical expressions, estimation, percent, absolute value, properties of numbers (such as divisibility and properties of primes and odd and even integers).

Some facts about arithmetic that might be helpful.

An odd integer power of a negative number is negative, and an even integer power is positive; for example, $(-2)^3 = -8$ and $(-2)^2 = 4$.

Squaring a number between 0 and 1 (or raising it to a higher power) results in a smaller number; for example, $(\frac{1}{3})^2 = \frac{1}{9}$ and $(0.5)^3 = 0.125$.

The sum and product of even and odd integers will be even or odd depending on the operation and the kinds of integers; for example, the sum of an odd integer and an even integer is odd.

If an integer P is a divisor (or a factor) of another integer N, then N is the product of P and another integer, and N is said to be a multiple of P; for example, 3 is a divisor (or a factor) of 6, and 6 is a multiple of 3.

A *prime* number is an integer that has only two distinct positive divisors, 1 and itself; for example, 2, 3, 5, 7, and 11 are primes, but 9 is not a prime because it has three positive divisors: 1, 3, and 9.

The sum and product of signed numbers will be positive or negative depending on the operation and the signs of the numbers; for example, the product of a negative number and a positive number is negative.

For any two numbers on the number line, the number on the left is less than the number on the right; for example, $2 < 3$ and $-4 < -3$.

The radical sign $\sqrt{\ }$ means "the nonnegative square root of"; for example, $\sqrt{0} = 0$ and $\sqrt{4} = 2$.

If n is a positive integer, then x^n denotes the product of n factors of x; for example, 3^4 means $3 \cdot 3 \cdot 3 \cdot 3 = 81$.

Note that $x^0 = 1$ and that division by zero is undefined; that is, $\frac{x}{0}$ has no meaning.

The *absolute value* of x, $|x|$, is equal to x if $x \geq 0$ and equal to $-x$ if $x < 0$; for example, $|8| = 8$ and $|-8| = -(-8) = 8$.

ALGEBRA

Questions classified as *algebra* include those involving the following topics: factoring and simplifying algebraic expressions, concepts of relations and functions, equations, and inequalities. The skills required include the ability to solve first and second degree equations and inequalities, and simultaneous equations; the ability to read a word problem and set up the necessary equations or inequalities to solve it; and the ability to apply basic algebraic skills to solve problems.

Some facts about algebra that might be helpful.

If $ab = 0$, then either $a = 0$ or $b = 0$; for example, if $(x - 1)(x + 2) = 0$, it follows that either $x - 1 = 0$ or $x + 2 = 0$; therefore, $x = 1$ or $x = -2$.

Adding a number to or subtracting a number from both sides of an equation preserves the equality. Similarly, multiplying or dividing both sides of an equation by a nonzero number preserves the equality. Similar rules apply to inequalities, except that multiplying or dividing both sides of an inequality by a *negative* number reverses the inequality. For example, multiplying the inequality $3x - 4 > 5$ by 4 yields the inequality $12x - 16 > 20$; however, multiplying that same inequality by -4 yields $-12x + 16 < -20$.

The following rules for exponents may be useful. If r, s, x, and y are positive numbers, then

(a) $x^{-r} = \frac{1}{x^r}$; for example, $5^{-3} = \frac{1}{5^3} = \frac{1}{125}$

(b) $x^r \cdot x^s = x^{r+s}$; for example, $3^2 \cdot 3^4 = 3^6 = 729$

(c) $x^r \cdot y^r = (xy)^r$; for example, $3^4 \cdot 2^4 = 6^4 = 1,296$

(d) $(x^r)^s = x^{rs}$; for example, $(2^3)^4 = 2^{12} = 4,096$

(e) $\frac{x^r}{x^s} = x^{r-s}$; for example, $\frac{4^2}{4^5} = 4^{2-5} = 4^{-3} = \frac{1}{4^3} = \frac{1}{64}$

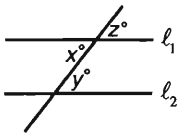
GEOMETRY

Questions classified as *geometry* include those involving the following topics: properties associated with parallel lines, circles, triangles (including isosceles, equilateral, and $30° - 60° - 90°$), rectangles, other polygons, area, perimeter, volume, the Pythagorean Theorem, angle measure in degrees, and simple coordinate geometry (including slope, intercepts, and graphing of equations and inequalities). The ability to construct proofs is not measured.

Some facts about geometry that might be helpful.
If two lines intersect, the vertical angles are equal; for example, in the figure

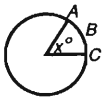
, $x = y$.

If two parallel lines are intersected by a third line, certain of the angles formed are equal; for example, in the figure



where $\ell_1 \parallel \ell_2$, $y = x = z$.

The number of degrees of arc in a circle is 360; in the figure



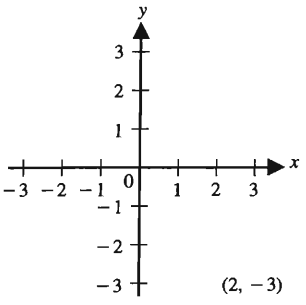
the length of arc ABC is $\frac{x}{360}$ times the circumference of the circle.

The sum of the degree measures of the angles of a triangle is 180.

The volume of a rectangular solid or of a right circular cylinder is the product of the area of the base and the height; for example, the volume of a cylinder with base of radius 2 and height 5 is $\pi(2^2)(5) = 20\pi$.

The square of the length of the hypotenuse of a right triangle is equal to the sum of the squares of the lengths of the two legs (Pythagorean Theorem).

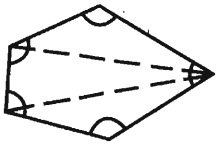
The coordinates of a point (x, y) give the location of the point in the rectangular coordinate plane; for example, the point $(2, -3)$ is located 2 units to the right of the y-axis and 3 units below the x-axis. Unless noted otherwise, the units used on the x-axis and the y-axis are the same.



The graph of linear equation $y = mx + b$ has a slope of m and a y-intercept of b.

The sides of a 45° – 45° – 90° triangle are in the ratio 1: 1: $\sqrt{2}$, and the sides of a 30° – 60° – 90° triangle are in the ratio $1: \sqrt{3} : 2$.

Drawing in lines that are not shown in a figure can sometimes be helpful in solving a geometry problem; for example, by drawing the dashed lines in the pentagon



, the number of degrees in the pentagon can be found by adding up the number of degrees in the three triangles.

DATA ANALYSIS

Questions classified as *data analysis* include those involving the following topics: basic descriptive statistics (such as mean, median, mode, range, standard deviation, and percentiles), interpretation of data given in graphs and tables (such as bar and circle graphs, and frequency distributions), elementary probability, and the ability to synthesize information, to select appropriate data for answering a question, and to determine whether or not the data provided are sufficient to answer a given question. The emphasis in these questions is on the understanding of basic principles and reasoning within the context of given information, not on calculations.

Some facts about descriptive statistics and probability that might be helpful.
In a distribution of n measurements, the (arithmetic) *mean* is the sum of the measurements divided by n. The *median* is the middle measurement after the measurements are ordered by size if n is odd or the mean of the two middle measurements if n is even. The *range* is the difference between the greatest measurement and the least measurement. Thus, for the measurements: 70, 72, 72, 76, 78, and 82, the mean is $450 \div 6 = 75$, the median is $(72 + 76) \div 2 = 74$, and the range is 12. Note that the mean and the median must be between the least measurement and the greatest measurement.

The probability that an event will occur is a value between 0 and 1, inclusive. If p is the probability that a particular event will occur, $0 \le p \le 1$, then the probability that the event will not occur is $1 - p$. For example, if the probability is 0.85 that it will rain tomorrow, then the probability that it will not rain tomorrow is $1 - 0.85 = 0.15$.

The quantitative measure employs two types of questions: quantitative comparison and problem solving.

QUANTITATIVE COMPARISON

The quantitative comparison questions test the ability to reason quickly and accurately about the relative sizes of two quantities or to perceive that not enough information is provided to make such a comparison. To solve a quantitative comparison problem, compare the quantities given in two columns, Column A and Column B, and decide whether one quantity is greater than the other, whether the two quantities are equal, or whether the relationship cannot be determined from the information given. Some questions only require some manipulation to determine which of the quantities is greater; other questions require more reasoning or thinking of special cases in which the relative sizes of the quantities are reversed.

The following strategies might help in answering quantitative comparison questions.

- Do not waste time performing needless computations in order to eventually compare two specific numbers. Simplify or transform one or both of the given quantities only as much as is necessary to determine which quantity is greater or whether the two quantities are equal. Once you have determined that one quantity is greater than the other, do not take time to find the exact sizes of the quantities. Answer and go on to the next question.
- Consider all kinds of numbers before you make a decision. As soon as you establish that the quantity in one column is greater in one case while the quantity in the other column is greater in another case, choose answer (D) immediately and move on to the next question.
- Geometric figures may not be drawn to scale. Comparisons should be made based on knowledge of mathematics rather than appearance. However, you can sometimes find a clue by sketching another figure in the margin of your test book or on the scratch paper provided. Try to visualize the parts of a figure that are fixed by the information given and the parts that are collapsible and changeable. If a figure can flow into other shapes and sizes while conforming to given information, the answer could be (D).

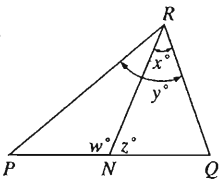
Directions for quantitative comparison questions and some examples with explanations follow.

Directions: **Each of the following questions consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose**

(A) if the quantity in Column A is greater;
(B) if the quantity in Column B is greater;
(C) if the two quantities are equal;
(D) if the relationship cannot be determined from the information given.

Note: **Since there are only four choices, NEVER MARK (E).**

Common Information: **In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.**

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ
Examples 2-4 refer to ΔPQR.			
Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ **(since equal measures cannot be assumed, even though PN and NQ appear equal)**
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ **(since N is between P and Q)**
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ **(since PQ is a straight line)**

	Column A	Column B
9.	**9.8**	$\sqrt{100}$

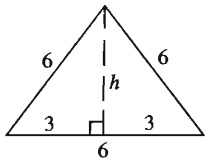
$\sqrt{100}$ denotes 10, the positive square root of 100. (For any positive number x, $\sqrt{x}$ denotes the *positive* number whose square is x.) Since 10 is greater than 9.8, the best answer is (B). It is important not to confuse this question with a comparison of 9.8 and x where $x^2 = 100$. The latter comparison would yield (D) as the correct answer because $x^2 = 100$ implies that either $x = 10$ or $x = -10$, and there is no way to determine which value x actually would have.

10. $(-6)^4$ $(-6)^5$

Since $(-6)^4$ is the product of four negative factors, and the product of an even number of negative numbers is positive, $(-6)^4$ is positive. Since the product of an odd number of negative numbers is negative, $(-6)^5$ is negative. Therefore, $(-6)^4$ is greater than $(-6)^5$ since any positive number is greater than any negative number. The best answer is (A). It is not necessary to calculate that $(-6)^4 = 1{,}296$ and that $(-6)^5 = -7{,}776$ in order to make the comparison.

11.	**The area of an equilateral triangle with side 6**	**The area of a right triangle with legs $\sqrt{3}$ and 9**

The area of a triangle is one half the product of the lengths of the base and the altitude. In Column A, the length of the altitude must first be determined. A sketch of the triangle may be helpful.



The altitude h divides the base of an equilateral triangle into two equal parts. From the Pythagorean Theorem, $h^2 + 3^2 = 6^2$ or $h = 3\sqrt{3}$. Therefore, the area of the triangle in Column A is $\frac{1}{2} \cdot 6 \cdot 3\sqrt{3} = 9\sqrt{3}$. In Column B, the base and the altitude of the right triangle are the two legs; therefore, the area is $\frac{1}{2} \cdot 9 \cdot \sqrt{3} = \frac{9\sqrt{3}}{2}$. Since $9\sqrt{3}$ is greater than $\frac{9\sqrt{3}}{2}$, the best answer is (A).

$$x^2 = y^2 + 1$$

12. x y

From the given equation, it can be determined that $x^2 > y^2$; however, the relative sizes of x and y cannot be determined. For example, if $y = 0$, x could be 1 or -1 and, since there is no way to tell which number x is, the best answer is (D).

Column A	Column B

Class	Class Size	Mean Score
1	50	89
2	30	81
3	20	85

13. Three classes took the same psychology test. The class sizes and (arithmetic) mean scores are shown.

The overall (arithmetic) mean score for the 3 classes	**85**

The overall mean score could be found by weighting each mean score by class size and dividing the result by 100, the total of all the class sizes, as follows.

$$\frac{(50)(89) + (30)(81) + (20)(85)}{100} = 85.8$$

Therefore, the best answer is (A). However, the calculations are unnecessary; classes 1 and 2 must have a mean greater than 85 since the mean of 89 and 81 is 85 and there are 20 more students in class 1 than in class 2. Since class 3 has a mean of 85, it must be true that the overall mean for the 3 classes is greater than 85.

PROBLEM SOLVING

The problem solving questions are standard multiple choice questions with five answer choices. To answer a question, select the best of the answer choices. Some problem solving questions are discrete and contain all the information needed for answering them; others occur in sets of two to five questions that share common information. For some of the questions the solution requires only simple computations or manipulations; for others the solution requires reading and understanding a problem in an applied or abstract setting.

The following strategies might be helpful in answering problem solving questions.

- Read each question carefully to determine what information is given and what is being asked.
- Before attempting to answer a question, scan the answer choices; otherwise you may waste time putting answers in a form that is not given (for example, putting an answer in the form $\frac{\sqrt{2}}{2}$ when the options are given in the form $\frac{1}{\sqrt{2}}$, or finding the answer in decimal form, such as 3.25, when the choices are given in fractional form, such as $3\frac{1}{4}$).

- For questions that require approximations, scan the answer choices to get some idea of the required closeness of approximation; otherwise you may waste time on long computations when a short mental process would be sufficient (for example, finding 48 percent of a number when taking half of the number would give a close enough approximation).

Directions for problem solving questions and some examples of discrete questions with explanations follow.

***Directions:* Each of the following questions has five answer choices. For each of these questions, select the best of the answer choices given.**

14. The average (arithmetic mean) of x and y is 20. If $z = 5$, what is the average of x, y, and z?

(A) $8\frac{1}{3}$ **(B) 10** **(C)** $12\frac{1}{2}$ **(D) 15** **(E)** $17\frac{1}{2}$

Since the average of x and y is 20, $\frac{x+y}{2} = 20$, or $x + y = 40$. Thus $x + y + z = x + y + 5 = 40 + 5 = 45$, and therefore $\frac{x+y+z}{3} = \frac{45}{3} = 15$. The best answer is (D).

15. In a certain year, Minnesota produced $\frac{2}{3}$ and Michigan produced $\frac{1}{6}$ of all the iron ore produced in the United States. If all the other states combined produced 18 million tons that year, how many million tons did Minnesota produce that year?

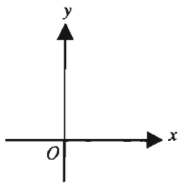
(A) 27 (B) 36 (C) 54 (D) 72 (E) 162

Since Minnesota produced $\frac{2}{3}$ and Michigan produced $\frac{1}{6}$ of all the iron ore produced in the United States, the two states together produced $\frac{5}{6}$ of the iron ore. Therefore, the 18 million tons produced by the rest of the United States was $\frac{1}{6}$ of the total production. Thus the total United States production was $6 \cdot 18 = 108$ million tons, and Minnesota produced $\frac{2}{3}(108) = 72$ million tons. The best answer is (D).

16. If $\frac{x}{3} - \frac{x}{6} + \frac{x}{9} - \frac{x}{12} = 1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4}$, then x =

(A) 3 (B) 1 (C) $\frac{1}{3}$ **(D)** $-\frac{1}{3}$ **(E) −3**

This problem can be solved without a lot of computation by factoring $\frac{x}{3}$ out of the expression on the left side of the equation, i.e., $\frac{x}{3} - \frac{x}{6} + \frac{x}{9} - \frac{x}{12} = \frac{x}{3}(1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4})$, and substituting the factored expression into the equation, obtaining $\frac{x}{3}(1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4}) = 1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4}$. Dividing both sides of the equation by $1 - \frac{1}{2} + \frac{1}{3} - \frac{1}{4}$ (which is not zero) gives the resulting equation $\frac{x}{3} = 1$. Thus $x = 3$ and the best answer is (A).



17. If the equation $y = 3x - 18$ were graphed on the coordinate axes above, the graph would cross the y-axis at the point (x,y) where

(A) $x = 0$ and $y = 18$
(B) $x = 0$ and $y = -18$
(C) $x = 0$ and $y = 6$
(D) $x = 6$ and $y = 0$
(E) $x = -6$ and $y = 0$

A graph crosses the y-axis at a point (x,y) where $x = 0$. In the given equation, when $x = 0$, $y = 3(0) - 18 = -18$. Therefore, the graph would cross the y-axis at the point $(0, -18)$, and the best answer is (B).

18. The operation denoted by the symbol ♦ is defined for all real numbers p and r as follows.

$$p \blacklozenge r = pr - p + r$$

What is the value of $(-4) \blacklozenge 5$?

(A) −9
(B) −11
(C) −19
(D) 19
(E) 21

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By the definition,

$$(-4) \blacklozenge 5 = (-4)(5) - (-4) + 5 = -20 + 4 + 5 = -11,$$

and therefore the best answer is (B).

Some problem solving questions involve data analysis; many of these occur in sets of two to five questions which share common data in the form of tables, graphs, etc.

The following strategies might help in answering problem solving questions that involve data analysis.

- Scan the data briefly to see what it is about, but do not attempt to analyze it in too much detail before reading the questions. Focus on those aspects of the data that are necessary to answer the questions. Be sure to read all notes related to the data.
- When possible, try to make visual comparisons of the data given in a graph and estimate products and quotients rather than perform involved computations.

■ Remember that these questions are to be answered only on the basis of the data given, everyday facts (such as the number of days in a year), and your knowledge of mathematics. Do not make use of specific information you recall that may seem to relate to the particular situation on which the questions are based unless that information can be derived from the data provided.

Some examples of problem solving questions involving data analysis with explanations follow.

Questions 19-21 refer to the following table.

PERCENT CHANGE IN DOLLAR AMOUNT OF SALES IN CERTAIN RETAIL STORES FROM 1977 TO 1979

Store	Percent Change From 1977 to 1978	Percent Change From 1978 to 1979
P	+10	−10
Q	−20	+9
R	+5	+12
S	−7	−15
T	+17	−8

19. In 1979, for which of the stores was the dollar amount of sales greater than that of any of the others shown?
(A) *P* (B) *Q* (C) *R* (D) *S*
(E) It cannot be determined from the information given.

Since the only information given in the table is the percent change from year to year, there is no way to compare the dollar amount of sales for the stores in 1979 or in any other year. The best answer is (E).

20. In store *T*, the dollar amount of sales for 1978 was approximately what percent of the dollar amount of sales for 1979?
(A) 86% (B) 92% (C) 109% (D) 117% (E) 122%

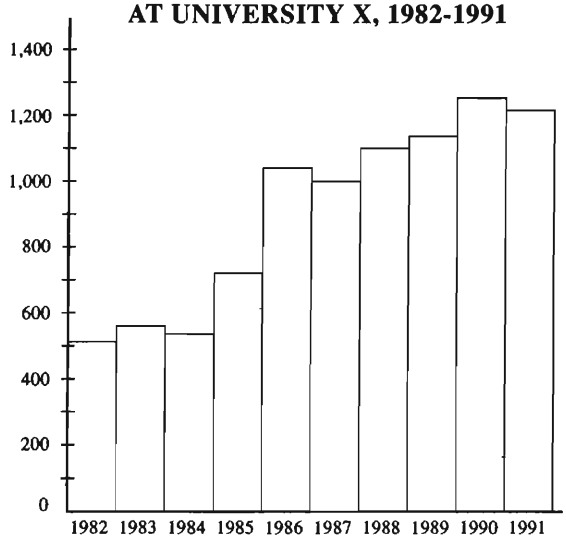
If A is the amount of sales for store T in 1978, then $0.08A$ is the amount of decrease and $A - 0.08A = 0.92A$ is the amount of sales for 1979. Therefore, the desired result can be obtained by dividing A by $0.92A$, which equals $\frac{1}{0.92}$, or approximately 109%. The best answer is (C).

21. If the dollar amount of sales in store *P* was $800,000 in 1977, what was the dollar amount of sales in that store in 1979?
(A) $727,200 (B) $792,000 (C) $800,000
(D) $880,000 (E) $968,000

If sales in store P were $800,000 in 1977, then in 1978 they were 110 percent of that, i.e., $880,000. In 1979 sales were 90 percent of $880,000, i.e., $792,000. Note that an increase of 10 percent in one year and a decrease of 10 percent in the following year does not result in the same dollar amount as the original dollar amount of sales because the base used in computing the percents changes from $800,000 to $880,000. The best answer is (B).

Questions 22-23 refer to the following graph.

NUMBER OF GRADUATE STUDENT APPLICANTS AT UNIVERSITY X, 1982-1991



22. In which of the following years did the number of graduate student applicants increase the most from that of the previous year?
(A) 1985 (B) 1986 (C) 1988 (D) 1990 (E) 1991

This question can be answered directly by visually comparing the heights of the bars in the graph. The greatest increase in height between two adjacent bars occurs for the years 1985 and 1986. The best answer is (B).

23. Which of the following statements can be inferred from the graph?
I. The number of graduate student applicants more than doubled from 1982 to 1991.
II. For each of the years 1983 to 1991, inclusive, the number of graduate student applicants was greater than that of the previous year.
III. The greatest number of graduate students attended University X in 1990.
(A) I only
(B) II only
(C) III only
(D) I and III only
(E) I, II, and III

For this type of question it is helpful to consider each statement separately. Statement I is true because, as shown in the graph, the number of applicants in 1982 was below 600 and the number in 1991 was above 1,200. Statement II is false because there are three years in which the number of applicants decreased from that of the previous year, namely 1984, 1987, and 1991. Statement III cannot be inferred from the graph because the graph shows only the number of applicants and gives no information about the number of students attending University X. Therefore, Statement I only can be inferred from the graph, and the best answer is (A).

ANALYTICAL ABILITY

These sections of the General Test are designed to measure the ability to think logically, both in a rule-constrained, relatively formal way and in a common sense, relatively informal way.

The analytical measure includes any or all of the following three kinds of questions:

- *analytical reasoning* questions in groups of three or more, with each group based on a different set of conditions describing a fictional situation
- *logical reasoning* questions, based on short arguments or statements, or on simple graphs or tables, with the questions sometimes in pairs and sometimes separate
- *analysis of explanations* questions in groups, with each group based on a different fictional situation and result

The directions for analytical reasoning and logical reasoning questions in the analytical sections are the same and are as follows:

Directions: **Each question or group of questions is based on a passage, graph, table, or set of conditions. In answering some of the questions, it might be useful to draw a rough diagram. For each question, select the best answer choice given.**

ANALYTICAL REASONING

Analytical reasoning questions test the ability to understand a given structure of arbitrary relationships among fictitious persons, places, things, or events, and to deduce new information from the relationships given. Each analytical reasoning group consists of (1) a set of about three to seven related statements or conditions (and sometimes other explanatory material) describing a structure of relationships, and (2) three or more questions that test understanding of that structure and its implications. Although each question in a group is based on the same set of conditions, the questions are independent of one another; answering one question in a group does not depend on answering any other question.

No knowledge of formal logic or mathematics is required for solving analytical reasoning problems. Although some of the same processes of reasoning are involved in solving both analytical reasoning problems and problems in those specialized fields, analytical reasoning problems can be solved using knowledge, skills, vocabulary, and computational ability (simple addition and subtraction) common to college students.

Each group of analytical reasoning questions is based on a set of conditions that establish relationships among persons, places, things, or events. These relationships are common ones such as temporal order (X arrived before Y but after Z), spatial order (City X is west of point Y and point Z), set membership (If Professor Green serves on the committee, then Professor Brown must also serve), and cause and effect (Event Q always causes event R). The conditions should be read carefully to determine the exact nature of the relationship or relationships involved. Some relationships are fixed or constant (The second house on the block belongs to P). Other relationships are variable (Q must be assigned to either campsite 1 or campsite 3).

Some relationships that are not given can easily be deduced from those given. (If one condition about books on a shelf specifies that book L is to the left of book Y, and another specifies that book P is to the left of book L, then it can be deduced that book P is to the left of book Y.)

The following strategies may be helpful in answering analytical reasoning questions:

- Many questions are much easier to solve than they initially appear to be. Do not feel intimidated by a group of questions merely because its conditions look long or complicated.
- In reading the conditions, do not introduce unwarranted assumptions.
- Since it is intended that the conditions be as clear as possible, avoid interpreting them as if they were designed to trick you by means of hidden ambiguities or other such devices. When in doubt, read the conditions in their most obvious, common-language sense. This does not mean, however, that the language in the conditions is not intended to be read for precise meaning. It is essential, for instance, to pay particular attention to function words that describe or limit relationships, such as *only, exactly, never, always, must be, cannot be,* and the like.
- Many examinees find it useful to underline key points in the conditions or to draw a simple diagram, as the directions for the analytical sections suggest.

- Even though some people who solve analytical reasoning problems find diagrams to be helpful, do not be concerned if a particular problem in the test seems to be best approached without the use of diagrams.
- Each question should be considered separately from the other questions in its group; no information, except what is given in the original conditions, should be carried over from one question to another.

Questions 24-25

A farmer plants only five different kinds of vegetables — beans, corn, kale, peas, and squash. Every year the farmer plants exactly three kinds of vegetables according to the following restrictions:

If the farmer plants corn, the farmer also plants beans that year.
If the farmer plants kale one year, the farmer does not plant it the next year.
In any year, the farmer plants no more than one of the vegetables the farmer planted in the previous year.

24. Which of the following is a possible sequence of combinations for the farmer to plant in two successive years?
(A) Beans, corn, kale; corn, peas, squash
(B) Beans, corn, peas; beans, corn, squash
(C) Beans, peas, squash; beans, corn, kale
(D) Corn, peas, squash; beans, kale, peas
(E) Kale, peas, squash; beans, corn, kale

Answer choices (A) and (D) are not possible because corn appears as a vegetable without beans in a given year. Answer choice (E) is not possible because kale appears in two successive years. Answer choice (B) is not possible because two vegetables are repeated in two successive years. Answer choice (C) contains a possible sequence of combinations.

25. If the farmer plants beans, corn, and kale in the first year, which of the following combinations must be planted in the third year?
(A) Beans, corn, and kale
(B) Beans, corn, and peas
(C) Beans, kale, and peas
(D) Beans, peas, and squash
(E) Kale, peas, and squash

Beans, peas, and squash are planted in the second year, since kale cannot be repeated two consecutive years and since corn cannot be repeated without repeating beans (only one vegetable can be repeated in consecutive years). In the third year, corn and kale must be planted (only one of the second-year vegetables can be repeated). Beans are planted whenever corn is planted, so (A) is the best answer choice.

LOGICAL REASONING

Logical reasoning questions test the ability to understand, analyze, and evaluate arguments. Some of the abilities tested by specific questions include identifying the roles played by specific phrases or sentences in an argument, recognizing the point of an argument, recognizing assumptions on which an argument is based, drawing conclusions and forming hypotheses, identifying methods of argumentation, evaluating arguments and counter-arguments, and analyzing evidence.

Each question or group of questions is based on a short argument or statement, or on a simple graph or table — generally the kind of material graduate students are likely to encounter in their academic and personal reading. Although material may be drawn from specific fields of study such as social studies, the humanities, and the physical sciences, materials from more familiar sources such as political speeches, advertisements, and informal discussions or dialogues also form the basis for some questions. No specialized knowledge of any particular field is required for answering the questions, however, and no knowledge of the terminology of formal logic is presupposed.

Specific questions asked about the arguments draw on information obtained by the process of critical and analytical reading described above.

The following strategies may be helpful in answering logical reasoning questions:

- The material on which questions are based should be read with close attention to such matters as (1) what is specifically presented about a subject, (2) what is not explicitly presented but necessarily follows from what is presented, (3) what is suggested or claimed without substantiation in what is presented. In addition, the means of relating statements, inferences, and claims — the structure of arguments — should be noted. It is important, in reading the arguments given, to attend to the soundness of the method employed and not to the actual truth of opinions presented.
- You should determine exactly what information the question is asking for; for instance, although it might be expected that one would be asked to detect or name the most glaring fault in a weak argument, the question posed may actually ask for the selection of one of a group of other arguments that reveals the same fault. In some cases, questions may ask for a negative response, for instance, a weakness that is NOT found in an argument or a conclusion that CANNOT be drawn from an argument.

26. Therapists find that treatment of those people who seek help because they are unable to stop smoking or overeating is rarely successful. From these experiences, therapists have concluded that such habits are intractable and that success in breaking them is rare.

As surveys show, millions of people have dropped the habit of smoking, and many people have successfully managed a substantial weight loss.

If all of the statements above are correct, an explanation that resolves their apparent contradiction is provided by the hypothesis that

(A) there have been some successes in therapy, and those successes were counted in the surveys
(B) it is easier to stop smoking than it is to stop overeating
(C) it is easy to break the habits of smoking and overeating by exercising willpower
(D) the group of people selected for the surveys did not include those who failed to break their habits even after therapy
(E) those who succeed in curing themselves do not go for treatment and so are not included in the therapists' data

If, as (E) suggests, those who can succeed on their own do not seek treatment, it is quite understandable why therapists do not encounter them as patients. Thus the restricted group of patients they see would lead them to the conclusion they draw. At the same time, (E) is consistent with the survey results. Therefore, (E) is the correct answer.

(A) is incorrect. Even assuming that (A) is true, no light is shed on why successes should be so rare in therapy, and yet, if the surveys are to be believed, so common overall.

(B) is incorrect. Since the comparative strength of habits is not an issue in the therapists' findings or the surveys, it cannot have anything to do with the apparent contradiction; consequently, information about it cannot help resolve that contradiction.

(C) is incorrect. If (C) were true, the survey results would appear rather unremarkable, but the therapists' findings would be baffling. The apparent contradiction would not be diminished but underscored.

(D) is incorrect. The survey results as reported focus on the numbers of people who have successfully broken a habit, not on the proportion of those trying to break their habits who succeeded. (D) pertains only to the latter and so is essentially irrelevant.

27. The greatest chance for the existence of extraterrestrial life is on a planet beyond our solar system. After all, the Milky Way galaxy alone contains 100 billion other suns, many of which could be accompanied by planets similar enough to Earth to make them suitable abodes of life.

The argument above assumes which of the following?

(A) Living creatures on another planet would probably have the same appearance as those on Earth.
(B) Life cannot exist on other planets in our solar system.
(C) If the appropriate physical conditions exist, life is an inevitable consequence.
(D) More than one of the suns in the galaxy is accompanied by an Earth-like planet.
(E) It is likely that life on another planet would require conditions similar to those on Earth.

In stating that planets may exist that are similar enough to Earth to make them suitable for supporting life, the author implicitly rules out planets dissimilar to Earth as likely to support life. The assumption underlying the argument is that life on another planet is likely to require conditions similar to those on Earth. Therefore, (E) is the correct answer.

(A) is incorrect. The argument assumes nothing about the appearance of extraterrestrial life.

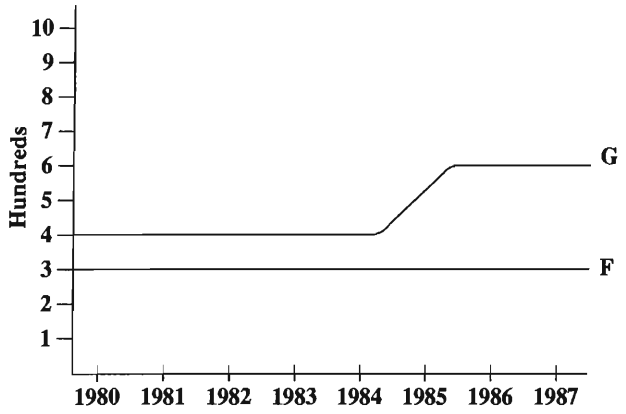
(B) is incorrect. The statements in the argument imply that it is relatively unlikely that life exists on other planets in our solar system, but those statements make no assumption that absolutely rules out the possibility that such life exists.

(C) is incorrect. Although the argument takes it for granted that there is the greatest chance for life when physical conditions are appropriate, it leaves open the possibility that no life will exist even with appropriate conditions.

(D) is incorrect. The argument grants that it is possible that more than one of the suns in the galaxy is accompanied by an Earth-like planet, but it does not assume that there are actually any such suns.

Questions 28-29 are based on the following graph.

POPULATION OF BIRD SPECIES *F* AND *G* IN THE STATE OF AVIARYA FROM 1980-1987



28. Which of the following, if true about 1984, would help explain the data illustrated in the graph on differences in population totals for species *F* and *G*?

(A) Harsh winter weather caused an unusually large portion of the species *F* population to migrate south of Aviarya temporarily.

(B) Gradual encroachment of human settlements on habitat suitable for species *G* occurred at an increasing rate.

(C) Species *G* was afforded protected status as the state bird of Aviarya.

(D) There were fewer observation stations in operation to count bird populations than there were in other years.

(E) Governmental plans for the expansion of tourism in the wild areas of Aviarya were drawn up and were proposed to the legislature.

The graph shows that species *G's* population rose from 400 to 600 during 1984 and 1985 and remained at 600 into 1987; species *F's* populations, however, remained unchanged between 1980 and 1987.

Granting species *G* protected status in the state in 1984 would most likely have resulted in an increase in *G's* population soon after the new protection began. This scenario is consistent with the data on the graph that show a population surge for *G* beginning in 1984. Therefore, (C) is the correct answer to question 28.

(A) is incorrect. Since *F's* population totals remained constant between 1980 and 1987, temporary seasonal fluctuations in the population of *F* are inconsistent with the graph of *F's* population totals.

(B) is incorrect. Human encroachment on habitat suitable for species *G* would most likely have had a negative impact on the population of the species, yet species *G* increased in number during 1984.

(D) is incorrect. There is no reason to believe that a decrease in the number of observation stations would result in an increase in the total number of birds observed during and after 1984.

(E) is incorrect. The possible effects of increased tourism on birds in the state cannot be determined, but in any case (E) does not say that tourism increased, only that plans for increased tourism were proposed. Therefore any link to increased bird population totals remains hypothetical.

29. It is claimed that the change in population occurred because the use of a certain pesticide was discontinued in 1984. Which of the following, if true about 1984, strengthens this claim?

(A) A disease that makes eggshells of birds of species *G* fragile was introduced in Aviarya.

(B) The pesticide was found to have been detrimental to insects that are the preferred food of species *G*.

(C) Many domestic cats that had become wild and were preying on young birds of species *G* were trapped and removed from the state.

(D) Birds of species *F* ate fruit that had earlier been sprayed with the pesticide.

(E) The weather was unusually cool, discouraging hatching of many crop-destroying insects that would otherwise have had to be controlled with the pesticide.

Indications that the pesticide discontinued in 1984 had been suppressing populations of a preferred food source of species *G* would strengthen the claim about the change in population, for the increased availability of its preferred food after the pesticide was discontinued would favor species *G*. (B), therefore, is the correct answer.

(A) is incorrect. The disease probably would have depressed, not increased, *G's* population, and there is no stated or implied connection between the disease and the pesticide.

(C) is incorrect. The removal of domestic cats from the state is another possible reason for the observed change in population, so it competes with the removal of the pesticide as a reason for the observed change.

(D) is incorrect. Species *F's* population remained stable. Thus knowing that birds of species *F* had been exposed to the pesticide indicates that the pesticide is not harmful to at least one kind of bird, and so might have been harmless to species *G* as well.

(E) is incorrect. It is already established that the pesticide was discontinued, so the fact that circumstances in 1984 did not require its use does not add information that might connect the change in pesticide use to the change in the population of species *G*. Further, if the insects were the type that species *G* eats, their not hatching would have had a negative effect on the population of species *G*.

ANALYSIS OF EXPLANATIONS

Analysis of explanations questions test abilities used in explanation: flexibility in generating explanations and evaluating relevance in terms of them, and in assessing the explanatory adequacy of statements. Special subject matter knowledge is not required. Each group of analysis of explanations questions consists of a situation and result along with questions directed toward explaining the result, given the situation. The questions might be presented in a three choice (A, B, C) format, with directions to choose the best answer, or in the format illustrated below, in which two choices (A, B) are available for each answer.

Directions: **Preceding each group of numbered statements is a question that can be answered "Yes" or "No." Answer this question separately for each statement in the group by marking answer choice A on your answer sheet for "Yes" or answer choice B for "No" next to the number for *each* statement. Be careful not to mark answer choices C, D, or E. Do not assume either that there are more "Yes" answers or that there are more "No" answers.**

30-33

Situation: The damming of the Palman River partially flooded the West Kenyan Wildlife Preserve and caused overcrowding of the animal population. Therefore, one hundred of the giraffes and one hundred of the Zimmerman gazelles were moved to the much larger East Kenyan preserve, where identical species of lions and giraffes as in the West Kenyan preserve and one species of gazelles, Allen gazelles, were already living. The only difference in climate was that the East Kenyan preserve averaged about ten inches less rain per year. In both preserves the prevailing winds were from the east, and the terrain was mainly flat.

Result: After three years in the East Kenyan preserve, the population of Zimmerman gazelles there had diminished almost to the point of extinction.

How this result arose from the given situation needs explanation.

You will be asked, for each of several statements, whether the statement is relevant to explaining how this result arose from the given situation. A statement is relevant if it provides information (beyond what is given in the situation) that *either* supports *or*, alternatively, weakens some possible adequate explanation.

You will also be asked, for each of several other statements, whether the statement could serve as a basis for explaining how this result arose from the given situation.

Do not consider extremely unlikely or farfetched explanations.

Question: Is the following statement, if true, relevant to some possible adequate explanation of how the result arose from the given situation?

30. No zoo has succeeded in breeding Allen gazelles in captivity.

31. The weather was normal in East Kenya during the three years after the transfer.

Question: Could the following statement, if true, form the basis for an adequate explanation of how the result arose from the given situation?

32. The animals successfully rounded up for the transfer included primarily the weaker Zimmerman gazelles, which then lost out in competition for grass with the Allen gazelles.

33. Kenya's efforts to increase hydroelectric power caused the overcrowding in the West Kenyan preserve.

Answers to practice statements 30-33.

30. The correct answer is B. This statement is irrelevant because it was Zimmerman gazelles, not Allen gazelles, that suffered the population decline, and because the captivity of the Zimmerman gazelles was not permanent, as in a zoo, but temporary, for the purposes of transportation.

31. The correct answer is A. This statement weakens, and so is relevant to, a possible explanation that there was a drought in the East Kenyan preserve so severe and protracted that no species of gazelle was able to survive there.

32. The correct answer is A. This statement adequately explains the result, because it shows how the process of transfer worked to diminish the vitality of the stock of transferred Zimmerman gazelles, and how competition with the Allen gazelles was then sufficient to produce the result.

33. The correct answer is B. This statement does not adequately explain how the result arose from the given situation; rather, it explains the damming of the river, which is only a part of the situation leading up to the result. There is still an unexplained gap between the situation and the result, namely, the reason why Zimmerman gazelles failed to flourish in the new location.

TEST 1

SECTION 1

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Nonviolent demonstrations often create such tensions that a community that has constantly refused to ------- its injustices is forced to correct them: the injustices can no longer be -------.

   (A) acknowledge. .ignored
   (B) decrease. .verified
   (C) tolerate. .accepted
   (D) address. .eliminated
   (E) explain. .discussed

2. Since 1813 reaction to Jane Austen's novels has oscillated between ------- and condescension; but in general later writers have esteemed her works more highly than did most of her literary -------.

   (A) dismissal. .admirers
   (B) adoration. .contemporaries
   (C) disapproval. .readers
   (D) indifference. .followers
   (E) approbation. .precursors

3. There are, as yet, no vegetation types or ecosystems whose study has been ------- to the extent that they no longer ------- ecologists.

   (A) perfected. .hinder
   (B) exhausted. .interest
   (C) prolonged. .require
   (D) prevented. .challenge
   (E) delayed. .benefit

4. Under ethical guidelines recently adopted by the National Institutes of Health, human genes are to be manipulated only to correct diseases for which ------- treatments are unsatisfactory.

   (A) similar (B) most (C) dangerous
   (D) uncommon (E) alternative

5. It was her view that the country's problems had been ------- by foreign technocrats, so that to invite them to come back would be counterproductive.

   (A) foreseen (B) attacked (C) ascertained
   (D) exacerbated (E) analyzed

6. Winsor McCay, the cartoonist, could draw with incredible -------: his comic strip about Little Nemo was characterized by marvelous draftmanship and sequencing.

   (A) sincerity (B) efficiency (C) virtuosity
   (D) rapidity (E) energy

7. The actual ------- of Wilson's position was always ------- by his refusal to compromise after having initially agreed to negotiate a settlement.

   (A) outcome. .foreshadowed
   (B) logic. .enhanced
   (C) rigidity. .betrayed
   (D) uncertainty. .alleviated
   (E) cowardice. .highlighted

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. SEDATIVE : DROWSINESS ::
   (A) epidemic : contagiousness
   (B) vaccine : virus
   (C) laxative : drug
   (D) anesthetic : numbness
   (E) therapy : psychosis

9. LAWYER : COURTROOM ::
   (A) participant : team
   (B) commuter : train
   (C) gladiator : arena
   (D) senator : caucus
   (E) patient : ward

10. CURIOSITY : KNOW ::
   (A) temptation : conquer
   (B) starvation : eat
   (C) wanderlust : travel
   (D) humor : laugh
   (E) survival : live

11. FRUGAL : MISERLY ::
   (A) confident : arrogant
   (B) courageous : pugnacious
   (C) famous : aggressive
   (D) rash : foolhardy
   (E) quiet : timid

12. ANTIDOTE : POISON ::
   (A) cure : recovery
   (B) narcotic : sleep
   (C) stimulant : relapse
   (D) tonic : lethargy
   (E) resuscitation : breathing

13. STYGIAN : DARK ::
   (A) abysmal : low
   (B) cogent : contentious
   (C) fortuitous : accidental
   (D) reckless : threatening
   (E) cataclysmic : doomed

14. WORSHIP : SACRIFICE ::
   (A) generation : pyre
   (B) burial : mortuary
   (C) weapon : centurion
   (D) massacre : invasion
   (E) prediction : augury

15. EVANESCENT : DISAPPEAR ::
   (A) transparent : penetrate
   (B) onerous : struggle
   (C) feckless : succeed
   (D) illusory : exist
   (E) pliant : yield

16. UPBRAID : REPROACH ::
   (A) dote : like
   (B) lag : stray
   (C) vex : please
   (D) earn : desire
   (E) recast : explain

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

It has been known for many decades that the appearance of sunspots is roughly periodic, with an average cycle of eleven years. Moreover, the incidence of solar flares and the flux of solar cosmic rays, ultraviolet radiation, and x-radiation all vary directly with the sunspot cycle. But after more than a century of investigation, the relation of these and other phenomena, known collectively as the solar-activity cycle, to terrestrial weather and climate remains unclear. For example, the sunspot cycle and the allied magnetic-polarity cycle have been linked to periodicities discerned in records of such variables as rainfall, temperature, and winds. Invariably, however, the relation is weak, and commonly of dubious statistical significance.

Effects of solar variability over longer terms have also been sought. The absence of recorded sunspot activity in the notes kept by European observers in the late seventeenth and early eighteenth centuries has led some scholars to postulate a brief cessation of sunspot activity at that time (a period called the Maunder minimum). The Maunder minimum has been linked to a span of unusual cold in Europe extending from the sixteenth to the early nineteenth centuries. The reality of the Maunder minimum has yet to be established, however, especially since the records that Chinese naked-eye observers of solar activity made at that time appear to contradict it. Scientists have also sought evidence of long-term solar periodicities by examining indirect climatological data, such as fossil records of the thickness of ancient tree rings. These studies, however, failed to link unequivocally terrestrial climate and the solar-activity cycle, or even to confirm the cycle's past existence.

If consistent and reliable geological or archaeological evidence tracing the solar-activity cycle in the distant past could be found, it might also resolve an important issue in solar physics: how to model solar activity. Currently, there are two models of solar activity. The first supposes that the Sun's internal motions (caused by rotation and convection) interact with its large-scale magnetic field to produce a dynamo, a device in which mechanical energy is converted into the energy of a magnetic field. In short, the Sun's large-scale magnetic field is taken to be self-sustaining, so that the solar-activity cycle it drives would be maintained with little overall change for perhaps billions of years. The alternative explanation supposes that the Sun's large-scale magnetic field is a remnant of the field the Sun acquired when it formed, and is not sustained against decay. In this model, the solar mechanism dependent on the Sun's magnetic field runs down more quickly. Thus, the characteristics of the solar-activity cycle could be expected to change over a long period of time. Modern solar observations span too short a time to reveal whether present cyclical solar activity is a long-lived feature of the Sun, or merely a transient phenomenon.

17. The author focuses primarily on

(A) presenting two competing scientific theories concerning solar activity and evaluating geological evidence often cited to support them

(B) giving a brief overview of some recent scientific developments in solar physics and assessing their impact on future climatological research

(C) discussing the difficulties involved in linking terrestrial phenomena with solar activity and indicating how resolving that issue could have an impact on our understanding of solar physics

(D) pointing out the futility of a certain line of scientific inquiry into the terrestrial effects of solar activity and recommending its abandonment in favor of purely physics-oriented research

(E) outlining the specific reasons why a problem in solar physics has not yet been solved and faulting the overly theoretical approach of modern physicists

18. Which of the following statements about the two models of solar activity, as they are described in lines 37-55, is accurate?

(A) In both models cyclical solar activity is regarded as a long-lived feature of the Sun, persisting with little change over billions of years.

(B) In both models the solar-activity cycle is hypothesized as being dependent on the large-scale solar magnetic field.

(C) In one model the Sun's magnetic field is thought to play a role in causing solar activity, whereas in the other model it is not.

(D) In one model solar activity is presumed to be unrelated to terrestrial phenomena, whereas in the other model solar activity is thought to have observable effects on the Earth.

(E) In one model cycles of solar activity with periodicities longer than a few decades are considered to be impossible, whereas in the other model such cycles are predicted.

GO ON TO THE NEXT PAGE.

19. According to the passage, late seventeenth- and early eighteenth-century Chinese records are important for which of the following reasons?

(A) They suggest that the data on which the Maunder minimum was predicated were incorrect.
(B) They suggest that the Maunder minimum cannot be related to climate.
(C) They suggest that the Maunder minimum might be valid only for Europe.
(D) They establish the existence of a span of unusually cold weather worldwide at the time of the Maunder minimum.
(E) They establish that solar activity at the time of the Maunder minimum did not significantly vary from its present pattern.

20. The author implies which of the following about currently available geological and archaeological evidence concerning the solar-activity cycle?

(A) It best supports the model of solar activity described in lines 37-45.
(B) It best supports the model of solar activity described in lines 45-52.
(C) It is insufficient to confirm either model of solar activity described in the third paragraph.
(D) It contradicts both models of solar activity as they are presented in the third paragraph.
(E) It disproves the theory that terrestrial weather and solar activity are linked in some way.

21. It can be inferred from the passage that the argument in favor of the model described in lines 37-45 would be strengthened if which of the following were found to be true?

(A) Episodes of intense volcanic eruptions in the distant past occurred in cycles having very long periodicities.
(B) At the present time the global level of thunderstorm activity increases and decreases in cycles with periodicities of approximately 11 years.
(C) In the distant past cyclical climatic changes had periodicities of longer than 200 years.
(D) In the last century the length of the sunspot cycle has been known to vary by as much as 2 years from its average periodicity of 11 years.
(E) Hundreds of millions of years ago, solar-activity cycles displayed the same periodicities as do present-day solar-activity cycles.

22. It can be inferred from the passage that Chinese observations of the Sun during the late seventeenth and early eighteenth centuries

(A) are ambiguous because most sunspots cannot be seen with the naked eye
(B) probably were made under the same weather conditions as those made in Europe
(C) are more reliable than European observations made during this period
(D) record some sunspot activity during this period
(E) have been employed by scientists seeking to argue that a change in solar activity occurred during this period

23. It can be inferred from the passage that studies attempting to use tree-ring thickness to locate possible links between solar periodicity and terrestrial climate are based on which of the following assumptions?

(A) The solar-activity cycle existed in its present form during the time period in which the tree rings grew.
(B) The biological mechanisms causing tree growth are unaffected by short-term weather patterns.
(C) Average tree-ring thickness varies from species to species.
(D) Tree-ring thicknesses reflect changes in terrestrial climate.
(E) Both terrestrial climate and the solar-activity cycle randomly affect tree-ring thickness.

GO ON TO THE NEXT PAGE.

The common belief of some linguists that each language is a perfect vehicle for the thoughts of the nation speaking it is in some ways the exact counterpart of the conviction of the Manchester school of economics that supply and demand will regulate everything for the best. Just as economists were blind to the numerous cases in which the law of supply and demand left actual wants unsatisfied, so also many linguists are deaf to those instances in which the very nature of a language calls forth misunderstandings in everyday conversation, and in which, consequently, a word has to be modified or defined in order to present the idea intended by the speaker: "He took his stick—no, not John's, but his own." No language is perfect, and if we admit this truth, we must also admit that it is not unreasonable to investigate the relative merits of different languages or of different details in languages.

Line
(5)
(10)
(15)

24. The primary purpose of the passage is to

(A) analyze an interesting feature of the English language
(B) refute a belief held by some linguists
(C) show that economic theory is relevant to linguistic study
(D) illustrate the confusion that can result from the improper use of language
(E) suggest a way in which languages can be made more nearly perfect

25. The misunderstanding presented by the author in lines 13-14 is similar to which of the following?

I. X uses the word "you" to refer to a group, but Y thinks that X is referring to one person only.
II. X mistakenly uses the word "anomaly" to refer to a typical example, but Y knows that "anomaly" means "exception."
III. X uses the word "bachelor" to mean "unmarried man," but Y mistakenly thinks that bachelor means "unmarried woman."

(A) I only
(B) II only
(C) III only
(D) I and II only
(E) II and III only

26. In presenting the argument, the author does all of the following EXCEPT

(A) give an example
(B) draw a conclusion
(C) make a generalization
(D) make a comparison
(E) present a paradox

27. Which of the following contributes to the misunderstanding described by the author in lines 13-14 ?

(A) It is unclear whom the speaker of the sentence is addressing.
(B) It is unclear to whom the word "his" refers the first time it is used.
(C) It is unclear to whom the word "his" refers the second time it is used.
(D) The meaning of "took" is ambiguous.
(E) It is unclear to whom "He" refers.

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. FALLACY: (A) personal philosophy (B) imaginative idea (C) unconfirmed theory (D) tentative opinion (E) valid argument

29. DIVULGE: (A) keep secret (B) evaluate by oneself (C) refine (D) restore (E) copy

30. BOYCOTT: (A) extort (B) underwrite (C) underbid (D) stipulate (E) patronize

31. ADULTERATION: (A) consternation (B) purification (C) normalization (D) approximation (E) rejuvenation

32. DEPOSITION: (A) process of congealing (B) process of distilling (C) process of eroding (D) process of evolving (E) process of condensing

33. ENERVATE: (A) recuperate (B) resurrect (C) renovate (D) gather (E) strengthen

34. LOQUACIOUS: (A) tranquil (B) skeptical (C) morose (D) taciturn (E) witty

35. REPINE: (A) intensify (B) excuse (C) express joy (D) feel sure (E) rush forward

36. VENERATION: (A) derision (B) blame (C) avoidance (D) ostracism (E) defiance

37. INVETERATE: (A) casual (B) public (C) satisfactory (D) trustworthy (E) sophisticated

38. UNDERMINE: (A) submerge (B) supersede (C) overhaul (D) undergird (E) intersperse

SECTION 2

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage, graph, table, or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-7

In a game, exactly six inverted cups stand side by side in a straight line, and each has exactly one ball hidden under it. The cups are numbered consecutively 1 through 6. Each of the balls is painted a single solid color. The colors of the balls are green, magenta, orange, purple, red, and yellow. The balls have been hidden under the cups in a manner that conforms to the following conditions:

The purple ball must be hidden under a lower-numbered cup than the orange ball.
The red ball must be hidden under a cup immediately adjacent to the cup under which the magenta ball is hidden.
The green ball must be hidden under cup 5.

1. Which of the following could be the colors of the balls under the cups, in order from 1 through 6 ?

(A) Green, yellow, magenta, red, purple, orange
(B) Magenta, green, purple, red, orange, yellow
(C) Magenta, red, purple, yellow, green, orange
(D) Orange, yellow, red, magenta, green, purple
(E) Red, purple, magenta, yellow, green, orange

2. If the magenta ball is under cup 4, the red ball must be under cup

(A) 1
(B) 2
(C) 3
(D) 5
(E) 6

3. A ball of which of the following colors could be under cup 6 ?

(A) Green
(B) Magenta
(C) Purple
(D) Red
(E) Yellow

4. If the purple ball is under cup 4, the orange ball must be under cup

(A) 1
(B) 2
(C) 3
(D) 5
(E) 6

5. Which of the following must be true?

(A) The green ball is under a lower-numbered cup than the yellow ball.
(B) The orange ball is under a lower-numbered cup than the green ball.
(C) The purple ball is under a lower-numbered cup than the green ball.
(D) The purple ball is under a lower-numbered cup than the red ball.
(E) The red ball is under a lower-numbered cup than the yellow ball.

6. If the orange ball is under cup 2, balls of which of the following colors could be under cups immediately adjacent to each other?

(A) Green and magenta
(B) Green and purple
(C) Orange and yellow
(D) Purple and red
(E) Red and yellow

7. If the magenta ball is under cup 1, balls of which of the following colors must be under cups immediately adjacent to each other?

(A) Green and orange
(B) Green and yellow
(C) Purple and red
(D) Purple and yellow
(E) Red and yellow

GO ON TO THE NEXT PAGE.

8. The company should not be held responsible for failing to correct the control-panel problem that caused the accident. Although the problem had been mentioned earlier in a safety inspector's report, companies receive hundreds of reports of such problems, and Industry Standard No. 42 requires action on these problems only when an accident is foreseeable.

   If the second sentence in the paragraph above is factually correct, the answer to which of the following questions is most relevant in helping to determine whether or not the company violated Industry Standard No. 42 when it failed to correct the control-panel problem?

   (A) Was the accident serious?
   (B) Was the control-panel problem of a type that is known to indicate that an accident is likely?
   (C) Since the accident, has the company done a special safety check on all control panels?
   (D) Did the safety inspector mention more than one problem in the same report?
   (E) How long was the control panel in use before the problem was discovered?

9. Riothamus, a fifth-century king of the Britons, was betrayed by an associate, fought bravely against the Goths but was defeated, and disappeared mysteriously. Riothamus' activities, and only those of Riothamus, match almost exactly those attributed to King Arthur. Therefore, Riothamus must be the historical model for the legendary King Arthur.

   The argument above requires at least one additional premise. Which of the following could be such a required premise?

   (A) Modern historians have documented the activities of Riothamus better than those of any other fifth-century king.
   (B) The stories told about King Arthur are not strictly fictitious but are based on a historical person and historical events.
   (C) Riothamus' associates were the authors of the original legends about King Arthur.
   (D) Legends about the fifth century usually embellish and romanticize the actual conditions of the lives of fifth-century nobility.
   (E) Posterity usually remembers legends better than it remembers the actual historical events on which they are based.

10. A worldwide ban on the production of certain ozone-destroying chemicals would provide only an illusion of protection. Quantities of such chemicals, already produced, exist as coolants in millions of refrigerators. When they reach the ozone layer in the atmosphere, their action cannot be halted. So there is no way to prevent these chemicals from damaging the ozone layer further.

    Which of the following, if true, most seriously weakens the argument above?

    (A) It is impossible to measure with accuracy the quantity of ozone-destroying chemicals that exist as coolants in refrigerators.
    (B) In modern societies, refrigeration of food is necessary to prevent unhealthy and potentially life-threatening conditions.
    (C) Replacement chemicals that will not destroy ozone have not yet been developed and would be more expensive than the chemicals now used as coolants in refrigerators.
    (D) Even if people should give up the use of refrigeration, the coolants already in existing refrigerators are a threat to atmospheric ozone.
    (E) The coolants in refrigerators can be fully recovered at the end of the useful life of the refrigerators and reused.

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Questions 11-15

A government is assigning each of six embassy office workers—Farr, Golden, Hayakawa, Inserra, Jones, and Kovacs—to embassies. There are four embassies. Embassies L and M are located in countries with dry climates, whereas embassies P and T are located in countries with humid climates. The office workers must be assigned according to the following rules:

Each embassy must have at least one of the workers assigned to it.
At least one embassy in a humid climate must have at least two workers assigned to it.
Golden cannot be assigned to the same embassy as Kovacs.
Inserra must be assigned to an embassy in a dry climate.
Jones must be assigned to an embassy in a humid climate.

11. Which of the following is an acceptable assignment of the workers to the embassies?

	L	M	P	T
(A)	Farr, Golden	Inserra, Kovacs	Hayakawa	Jones
(B)	Golden, Kovacs	Inserra	Jones	Farr, Hayakawa
(C)	Golden	Farr, Inserra	Kovacs	Jones, Hayakawa
(D)	Jones	Golden, Inserra	Hayakawa	Farr, Kovacs
(E)	Kovacs	Farr, Hayakawa	Inserra	Golden, Jones

12. Which of the following must be assigned either to embassy L or to embassy M ?

(A) Farr
(B) Golden
(C) Hayakawa
(D) Inserra
(E) Kovacs

13. Which of the following CANNOT be true?

(A) One worker is assigned to L.
(B) Two workers are assigned to P.
(C) Two workers are assigned to L.
(D) Three workers are assigned to M.
(E) Three workers are assigned to T.

14. If Golden and Kovacs are assigned to L and M, respectively, which of the following must be true?

(A) Farr is assigned to either P or T.
(B) Inserra is assigned to either P or T.
(C) P and T each have two workers assigned to them.
(D) Hayakawa is assigned to L.
(E) Hayakawa is assigned to T.

15. If Golden, Hayakawa, and Kovacs are among the workers assigned to embassies in humid climates, which of the following must be true?

(A) Farr is assigned to an embassy to which none of the other five office workers is assigned.
(B) Golden is assigned to an embassy to which none of the other five office workers is assigned.
(C) Jones is assigned to the same embassy as Kovacs.
(D) Hayakawa is assigned to the same embassy as Golden.
(E) Hayakawa is assigned to the same embassy as Kovacs.

GO ON TO THE NEXT PAGE.

Questions 16-19

A volunteer uses a truck to pick up donations of unsold food and clothing from stores and to deliver them to locations where they can be distributed. He drives only along a certain network of roads.

In the network there are two-way roads connecting each of the following pairs of points: 1 with 2, 1 with 3, 1 with 5, 2 with 6, 3 with 7, 5 with 6, and 6 with 7. There are also one-way roads going from 2 to 4, from 3 to 2, and from 4 to 3. There are no other roads in the network, and the roads in the network do not intersect.

To make a trip involving pickups and deliveries, the volunteer always takes a route that for the whole trip passes through the fewest of the points 1 through 7, counting a point twice if the volunteer passes through it twice.

The volunteer's home is at point 3. Donations can be picked up at a supermarket at point 1, a clothing store at point 5, and a bakery at point 4. Deliveries can be made as needed to a tutoring center at point 2, a distribution center at point 6, and a shelter at point 7.

16. If the volunteer starts at the supermarket and next is to go to the shelter, the first intermediate point his route passes through must be

    (A) 2
    (B) 3
    (C) 5
    (D) 6
    (E) 7

17. If, starting from home, the volunteer next is to make pickups for the shelter at the supermarket and the bakery (in either order), the first two intermediate points on his route, beginning with the first, must be

    (A) 1 and 2
    (B) 1 and 3
    (C) 2 and 1
    (D) 2 and 4
    (E) 4 and 2

18. If, starting from the clothing store, the volunteer next is to pick up bread at either the supermarket or the bakery (whichever stop makes his route go through the fewest of the points) and then is to go to the shelter, the first two points he reaches after the clothing store, beginning with the first, must be

    (A) 1 and 2
    (B) 1 and 3
    (C) 4 and 2
    (D) 6 and 2
    (E) 6 and 4

19. If the volunteer is to make a trip starting at the shelter, next going to the bakery for a pickup, and then ending at the distribution center, the first two intermediate points on his route, beginning with the first, can be

    (A) 3 and 1
    (B) 3 and 4
    (C) 4 and 2
    (D) 6 and 2
    (E) 6 and 5

Questions 20-22

A developer is planning to build a housing complex on an empty tract of land. Exactly seven different styles of houses—Q, R, S, T, W, X, and Z—will be built in the complex. The complex will contain several blocks, and the developer plans to put houses of at least three different styles on each block. The developer will build the complex according to the following rules:

Any block that has style Z on it must also have style W on it.
Any block adjacent to one that has on it both style S and style X must have on it style T and style Z.
No block adjacent to one that has on it both style R and style Z can have on it either style T or style W.
No block can have on it both style S and style Q.

20. Which of the following can be the complete selection of house styles on a block?

(A) Q, R, S
(B) Q, S, X
(C) R, T, Z
(D) S, W, Z
(E) T, X, Z

21. Which of the following house styles must be on a block that is adjacent to one that has on it only styles S, T, W, X, and Z?

(A) Q
(B) R
(C) S
(D) W
(E) X

22. Which of the following can be the complete selection of house styles for a block that is adjacent to exactly one block, if that one block has on it styles S, T, W, and X only?

(A) S, T, and X
(B) T, X, and Z
(C) R, S, X, and Z
(D) S, T, W, and X
(E) T, W, X, and Z

23. When an osprey (a fish-eating hawk) returns from fishing to its nesting area with a fish like an alewife, a pollack, or a smelt, other ospreys will retrace its flight path in hopes of good fishing. There is seldom such a response if the first bird brings back a winter flounder. Yet ospreys feed on winter flounder just as readily as on any other fish.

Which of the following, if true, contributes most to an explanation of the fishing behavior of ospreys as it is described above?

(A) Ospreys are seldom able to catch alewives, pollack, or smelt.
(B) Alewives, pollack, and smelt move in schools, but winter flounder do not.
(C) Winter flounder prefer shallower waters than do alewives, pollack, or smelt.
(D) Winter flounder and pollack exhibit protective coloration, but alewives and smelt do not.
(E) Ospreys that live in nesting areas are especially successful fishers.

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24. A recent study of an insurance company's underwriters indicated that those who worked in pleasant physical surroundings were 25 percent more productive than their peers in unpleasant physical surroundings. Objective criteria for evaluating job performance included caseload and complexity of cases. This shows that improving workers' environments increases those workers' productivity.

    Which of the following, if true, most seriously weakens the conclusion above?

    (A) On average, less-productive employees spend no fewer hours per day at their workstations than do their more-productive peers.
    (B) Unpleasant surroundings give employees less motivation to work hard than more pleasant surroundings do.
    (C) The more-productive employees are generally rewarded with pleasant office space.
    (D) More-productive employees do not work any more hours than their less-productive peers.
    (E) Peer pressure discourages employees in crowded, unpleasant surroundings from making phone calls to their own family members during work time.

25. In a certain country, individuals tend to change their political affiliation readily from one political party to another. In the past the Union party grew larger because of this tendency, but although most of those who change to a new party affiliation change to the Union party, the Union party has remained about the same size in recent years.

    Which of the following, if true, best helps to explain the change in the growth pattern of the Union party mentioned above?

    (A) The economy has been prospering recently, and many of those who change party affiliation are upwardly mobile and prosperous.
    (B) In recent years those who were previously nonaffiliated have tended to join the Union party if they joined any party at all.
    (C) The percentage of voting-age citizens who change political party affiliation each year has remained constant, and the number of voting-age citizens has remained the same.
    (D) The percentage of voting-age citizens who are affiliated with any political party has increased over the last ten years.
    (E) Many members of the Union party have abandoned all political party affiliation in recent years.

SECTION 3

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

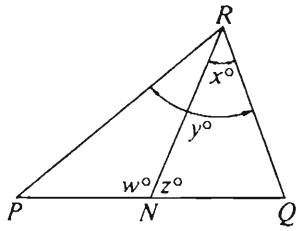
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

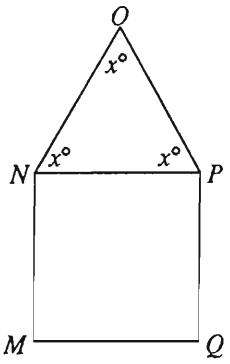
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	3^4	4^3

	Column A	Column B
	$x = 2y + 3$ $y = -2$	
2.	x	-1

	Column A	Column B
	$d = 5.03894$ and $\boxed{d}$ is the decimal expression for d rounded to the nearest thousandth.	
3.	The number of decimal places where d and $\boxed{d}$ differ	4

	Column A	Column B
	$x + 2y > 8$	
4.	$2x + 4y$	20

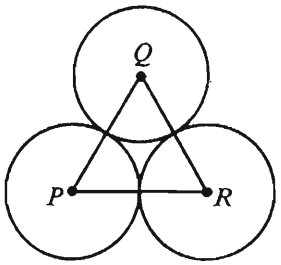


	Column A	Column B
	Square $MNPQ$ has area 36.	
5.	The perimeter of pentagon $MNOPQ$	30

	Column A	Column B
	p and q are different prime numbers. r is the least prime number greater than p, and s is the least prime number greater than q.	
6.	$r - p$	$s - q$

	Column A	Column B
	$\lvert -3 \rvert = -m$	
7.	m	3

	Column A	Column B
	n is an even integer and a multiple of 3.	
8.	The remainder when n is divided by 12	6



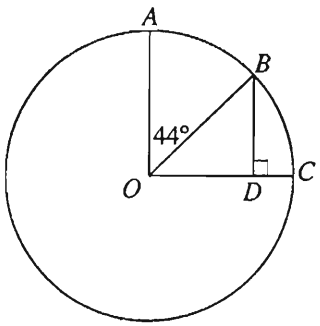
	Column A	Column B
	Equilateral triangle PQR is formed by joining centers P, Q, and R of the circles. Each pair of circles has exactly one point in common.	
9.	The perimeter of triangle PQR	The circumference of the circle with center Q

	Column A	Column B
10.	The volume of a cylindrical tank that has a radius of 2 meters and a height of 10 meters	The volume of a cylindrical tank that has a radius of 1 meter and a height of 20 meters

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Column A	Column B
$ds \neq 0$	
11. The time required to travel d miles at s miles per hour	The time required to travel $\frac{d}{2}$ miles at $2s$ miles per hour
$\triangle RST$ is isosceles and $\angle RST = 40°$.	
12. The sum of the measures of the two angles of $\triangle RST$ that have equal measure	120°
13. $\sqrt{x^4 + 6x^2 + 9}$	$x^2 + 3$

Column A	Column B
	
O is the center of the circle and $\angle AOC$ is a right angle.	
14. OD	BD
Before Maria changed jobs, her salary was 24 percent more than Julio's salary. After Maria changed jobs, her new salary was 24 percent less than her old salary.	
15. Julio's salary	Maria's new salary

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

---

16. $(19 - 18 - 17 - 16) - (20 - 19 - 18 - 17) =$

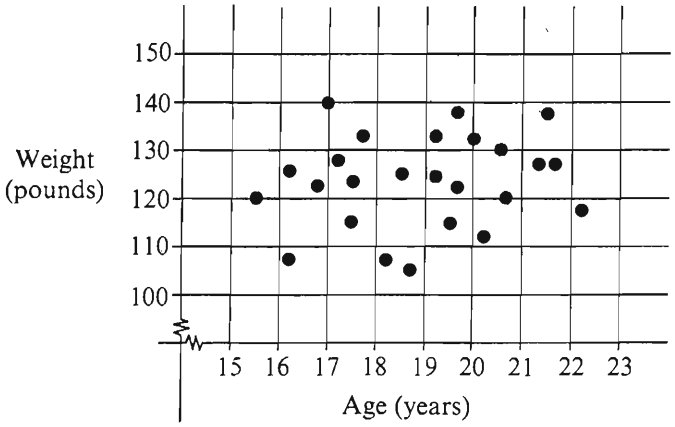
(A) -36
(B) -6
(C) -4
(D) 1
(E) 2

17. If $3x - 2 = 7$, then $4x =$

(A) 3
(B) 5
(C) $\frac{20}{3}$
(D) 9
(E) 12

18. Of the following, which is closest to $\sqrt[3]{30}$?

(A) 6
(B) 5
(C) 4
(D) 3
(E) 2



19. The dots on the graph above indicate age and weight for a sample of 25 students. What percent of these students are less than 19 years old and weigh more than 110 pounds?

(A) 36%
(B) 40%
(C) 44%
(D) 48%
(E) 52%

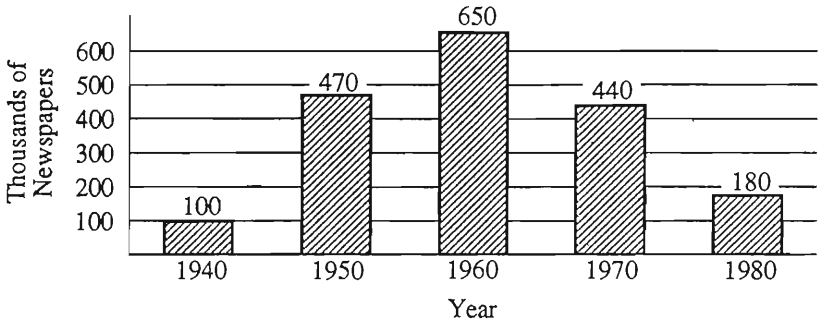
20. The greatest number of diagonals that can be drawn from one vertex of a regular 6-sided polygon is

(A) 2
(B) 3
(C) 4
(D) 5
(E) 6

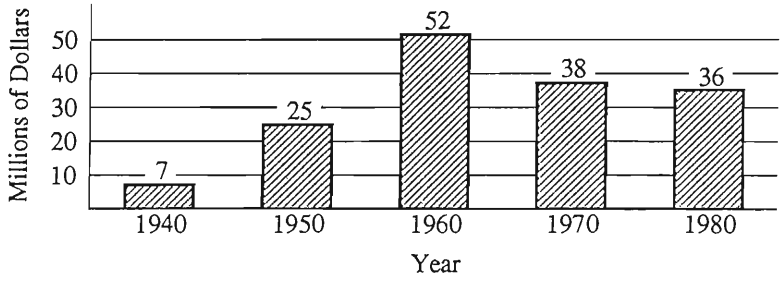
GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graphs.

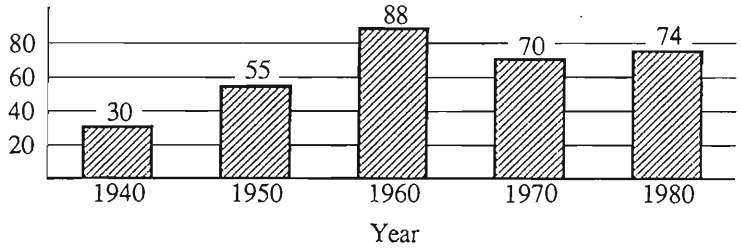
AVERAGE DAILY CIRCULATION FOR NEWSPAPER *X*



TOTAL YEARLY ADVERTISING REVENUE FOR NEWSPAPER *X*



AVERAGE NUMBER OF PAGES PER NEWSPAPER FOR NEWSPAPER *X*



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21. In how many of the years shown was the average number of pages per newspaper at least twice as much as the average in 1940 ?

(A) Four
(B) Three
(C) Two
(D) One
(E) None

22. In 1950, if the printing cost per newspaper was \$0.05, what would have been the total cost of printing the average daily circulation?

(A) \$32,500
(B) \$26,000
(C) \$23,500
(D) \$22,000
(E) \$2,600

23. In 1980 the number of dollars of advertising revenue was how many times as great as the average daily circulation?

(A) 500
(B) 200
(C) 100
(D) 50
(E) 20

24. The percent decrease in average daily circulation from 1960 to 1970 was approximately

(A) 10%
(B) 12%
(C) 20%
(D) 26%
(E) 32%

25. Which of the following statements can be inferred from the data?

I. The greatest increase in total yearly advertising revenue over any 10-year period shown was \$27 million.
II. In each of the 10-year periods shown in which yearly advertising revenue decreased, average daily circulation also decreased.
III. From 1970 to 1980 the average number of pages per newspaper increased by 10.

(A) I only
(B) II only
(C) III only
(D) I and II
(E) II and III

GO ON TO THE NEXT PAGE.

26. If $0 < st < 1$, then which of the following can be true?

(A) $s < -1$ and $t > 0$
(B) $s < -1$ and $t < -1$
(C) $s > -1$ and $t < -1$
(D) $s > 1$ and $t < -1$
(E) $s > 1$ and $t > 1$

27. On segment WZ above, if $WY = 21$, $XZ = 26$, and YZ is twice WX, what is the value of XY?

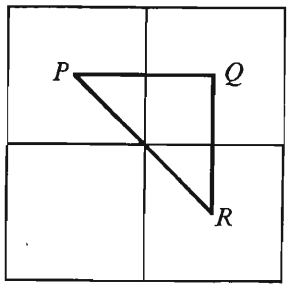
(A) 5
(B) 10
(C) 11
(D) 16
(E) It cannot be determined from the information given.

28. To reproduce an old photograph, a photographer charges x dollars to make a negative, $\frac{3x}{5}$ dollars for each of the first 10 prints, and $\frac{x}{5}$ dollars for each print in excess of 10 prints. If \$45 is the total charge to make a negative and 20 prints from an old photograph, what is the value of x?

(A) 3
(B) 3.5
(C) 4
(D) 4.5
(E) 5

29. Which of the following is equal to $\frac{1}{4}$ of 0.01 percent?

(A) 0.000025
(B) 0.00025
(C) 0.0025
(D) 0.025
(E) 0.25



30. In the figure above, each of the four squares has sides of length x. If $\triangle PQR$ is formed by joining the centers of three of the squares, what is the perimeter of $\triangle PQR$ in terms of x?

(A) $2x\sqrt{2}$

(B) $\frac{x\sqrt{2}}{2} + x$

(C) $2x + \sqrt{2}$

(D) $x\sqrt{2} + 2$

(E) $2x + x\sqrt{2}$

SECTION 4

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. The senator's reputation, though ------- by false allegations of misconduct, emerged from the ordeal -------.

   (A) shaken. .unscathed
   (B) destroyed. .intact
   (C) damaged. .impaired
   (D) impugned. .unclear
   (E) tarnished. .sullied

2. This poetry is not -------; it is more likely to appeal to an international audience than is poetry with strictly regional themes.

   (A) familiar (B) democratic (C) technical (D) complex (E) provincial

3. Experienced employers recognize that business students who can ------- different points of view are ultimately more effective as managers than are the brilliant and original students who ------- dogmatically to their own formulations.

   (A) discredit. .revert (B) assimilate. .adhere (C) impose. .refer (D) disregard. .incline (E) advocate. .relate

4. Poe's ------- reviews of contemporary fiction, which often find great merit in otherwise ------- literary gems, must make us respect his critical judgment in addition to his well-known literary talent.

   (A) thorough. .completed
   (B) petulant. .unpopular
   (C) insightful. .unappreciated
   (D) enthusiastic. .acclaimed
   (E) harsh. .undeserving

5. The significance of the Magna Carta lies not in its ------- provisions, but in its broader impact: it made the king subject to the law.

   (A) specific (B) revolutionary (C) implicit (D) controversial (E) finite

6. The theory of cosmic evolution states that the universe, having begun in a state of simplicity and -------, has ------- into great variety.

   (A) equilibrium. .modulated
   (B) homogeneity. .differentiated
   (C) contrast. .metamorphosed
   (D) proportion. .accelerated
   (E) intelligibility. .developed

7. Not wishing to appear -------, the junior member of the research group refrained from ------- any criticism of the senior members' plan for dividing up responsibility for the entire project.

   (A) reluctant. .evaluating
   (B) inquisitive. .offering
   (C) presumptuous. .venturing
   (D) censorious. .undercutting
   (E) moralistic. .observing

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. FRAGILE : BREAK ::
   (A) invisible : see
   (B) erratic : control
   (C) flammable : burn
   (D) noxious : escape
   (E) industrial : manufacture

9. MUTTER : INDISTINCT ::
   (A) demand : obedient
   (B) plead : obligatory
   (C) flatter : commendable
   (D) drone : monotonous
   (E) confirm : proven

10. FAULTFINDER : CRITICIZE ::
   (A) luminary : recognize
   (B) athlete : cheer
   (C) arbitrator : mediate
   (D) pharmacist : prescribe
   (E) dawdler : toil

11. PEST : IRKSOME ::
   (A) salesclerk : courteous
   (B) expert : proficient
   (C) enigma : unexpected
   (D) leader : nondescript
   (E) accuser : indicted

12. PROLOGUE : NOVEL ::
   (A) preamble : statute
   (B) sketch : drawing
   (C) movement : symphony
   (D) index : book
   (E) blueprint : building

13. EXPAND : VOLUME ::
   (A) ascend : flight
   (B) proliferate : number
   (C) bend : flexibility
   (D) cool : temperature
   (E) deflect : heading

14. CONTIGUOUS : ABUT ::
   (A) possible : occur
   (B) simultaneous : coincide
   (C) comprehensive : except
   (D) synthetic : create
   (E) constant : stabilize

15. SUITCASE : LUGGAGE ::
   (A) gift : package
   (B) necklace : garment
   (C) room : house
   (D) hat : millinery
   (E) faucet : sink

16. PROHIBITIVE : PURCHASE ::
   (A) preventive : heal
   (B) laudatory : praise
   (C) admonitory : fear
   (D) peremptory : dispute
   (E) imperative : comply

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

It is frequently assumed that the mechanization of work has a revolutionary effect on the lives of the people who operate the new machines and on the society into which the machines have been introduced. For example, it has been suggested that the employment of women in industry took them out of the household, their traditional sphere, and fundamentally altered their position in society. In the nineteenth century, when women began to enter factories, Jules Simon, a French politician, warned that by doing so, women would give up their femininity. Friedrich Engels, however, predicted that women would be liberated from the "social, legal, and economic subordination" of the family by technological developments that made possible the recruitment of "the whole female sex . . . into public industry." Observers thus differed concerning the social desirability of mechanization's effects, but they agreed that it would transform women's lives.

Historians, particularly those investigating the history of women, now seriously question this assumption of transforming power. They conclude that such dramatic technological innovations as the spinning jenny, the sewing machine, the typewriter, and the vacuum cleaner have not resulted in equally dramatic social changes in women's economic position or in the prevailing evaluation of women's work. The employment of young women in textile mills during the Industrial Revolution was largely an extension of an older pattern of employment of young, single women as domestics. It was not the change in office technology, but rather the separation of secretarial work, previously seen as an apprenticeship for beginning managers, from administrative work that in the 1880's created a new class of "dead-end" jobs, thenceforth considered "women's work." The increase in the numbers of married women employed outside the home in the twentieth century had less to do with the mechanization of housework and an increase in leisure time for these women than it did with their own economic necessity and with high marriage rates that shrank the available pool of single women workers, previously, in many cases, the only women employers would hire.

Women's work has changed considerably in the past 200 years, moving from the household to the office or the factory, and later becoming mostly white-collar instead of blue-collar work. Fundamentally, however, the conditions under which women work have changed little since before the Industrial Revolution: the segregation of occupations by gender, lower pay for women as a group, jobs that require relatively low levels of skill and offer women little opportunity for advancement all persist, while women's household labor remains demanding. Recent historical investigation has led to a major revision of the notion that technology is always inherently revolutionary in its effects on society. Mechanization may even have slowed any change in the traditional position of women both in the labor market and in the home.

17. Which of the following statements best summarizes the main idea of the passage?

(A) The effects of the mechanization of women's work have not borne out the frequently held assumption that new technology is inherently revolutionary.
(B) Recent studies have shown that mechanization revolutionizes a society's traditional values and the customary roles of its members.
(C) Mechanization has caused the nature of women's work to change since the Industrial Revolution.
(D) The mechanization of work creates whole new classes of jobs that did not previously exist.
(E) The mechanization of women's work, while extremely revolutionary in its effects, has not, on the whole, had the deleterious effects that some critics had feared.

18. The author mentions all of the following inventions as examples of dramatic technological innovations EXCEPT the

(A) sewing machine (B) vacuum cleaner
(C) typewriter (D) telephone
(E) spinning jenny

19. It can be inferred from the passage that, before the Industrial Revolution, the majority of women's work was done in which of the following settings?

(A) Textile mills (B) Private households
(C) Offices (D) Factories (E) Small shops

GO ON TO THE NEXT PAGE.

20. It can be inferred from the passage that the author would consider which of the following to be an indication of a fundamental alteration in the conditions of women's work?

(A) Statistics showing that the majority of women now occupy white-collar positions
(B) Interviews with married men indicating that they are now doing some household tasks
(C) Surveys of the labor market documenting the recent creation of a new class of jobs in electronics in which women workers outnumber men four to one
(D) Census results showing that working women's wages and salaries are, on the average, as high as those of working men
(E) Enrollment figures from universities demonstrating that increasing numbers of young women are choosing to continue their education beyond the undergraduate level

21. The passage states that, before the twentieth century, which of the following was true of many employers?

(A) They did not employ women in factories.
(B) They tended to employ single rather than married women.
(C) They employed women in only those jobs that were related to women's traditional household work.
(D) They resisted technological innovations that would radically change women's roles in the family.
(E) They hired women only when qualified men were not available to fill the open positions.

22. It can be inferred from the passage that the author most probably believes which of the following to be true concerning those historians who study the history of women?

(A) Their work provides insights important to those examining social phenomena affecting the lives of both sexes.
(B) Their work can only be used cautiously by scholars in other disciplines.
(C) Because they concentrate only on the role of women in the workplace, they draw more reliable conclusions than do other historians.
(D) While highly interesting, their work has not had an impact on most historians' current assumptions concerning the revolutionary effect of technology in the workplace.
(E) They oppose the further mechanization of work, which, according to their findings, tends to perpetuate existing inequalities in society.

23. Which of the following best describes the function of the concluding sentence of the passage?

(A) It sums up the general points concerning the mechanization of work made in the passage as a whole.
(B) It draws a conclusion concerning the effects of the mechanization of work which goes beyond the evidence presented in the passage as a whole.
(C) It restates the point concerning technology made in the sentence immediately preceding it.
(D) It qualifies the author's agreement with scholars who argue for a major revision in the assessment of the impact of mechanization on society.
(E) It suggests a compromise between two seemingly contradictory views concerning the effects of mechanization on society.

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(This passage is excerpted from an article that was published in 1982.)

Warm-blooded animals have elaborate physiological controls to maintain constant body temperature (in humans, 37° C). Why then during sickness should temperature rise, apparently increasing stress on the infected organism? It has long been known that the level of serum iron in animals falls during infection. Garibaldi first suggested a relationship between fever and iron. He found that microbial synthesis of siderophores—substances that bind iron—in bacteria of the genus *Salmonella* declined at environmental temperatures above 37° C and stopped at 40.3° C. Thus, fever would make it more difficult for an infecting bacterium to acquire iron and thus to multiply. Cold-blooded animals were used to test this hypothesis because their body temperature can be controlled in the laboratory. Kluger reported that of iguanas infected with the potentially lethal bacterium *A. hydrophilia*, more survived at temperatures of 42° C than at 37° C, even though healthy animals prefer the lower temperature. When animals at 42° C were injected with an iron solution, however, mortality rates increased significantly. Research to determine whether similar phenomena occur in warm-blooded animals is sorely needed.

24. The passage is primarily concerned with attempts to determine

(A) the role of siderophores in the synthesis of serum iron
(B) new treatments for infections that are caused by *A. hydrophilia*
(C) the function of fever in warm-blooded animals
(D) the mechanisms that ensure constant body temperature
(E) iron utilization in cold-blooded animals

25. According to the passage, Garibaldi determined which of the following?

(A) That serum iron is produced through microbial synthesis
(B) That microbial synthesis of siderophores in warm-blooded animals is more efficient at higher temperatures
(C) That only iron bound to other substances can be used by bacteria
(D) That there is a relationship between the synthesis of siderophores in bacteria of the genus *Salmonella* and environmental temperature
(E) That bacteria of the genus *Salmonella* require iron as a nutrient

26. Which of the following can be inferred about warm-blooded animals solely on the basis of information in the passage?

(A) The body temperatures of warm-blooded animals cannot be easily controlled in the laboratory.
(B) Warm-blooded animals require more iron in periods of stress than they do at other times.
(C) Warm-blooded animals are more comfortable at an environmental temperature of 37° C than they are at a temperature of 42° C.
(D) In warm-blooded animals, bacteria are responsible for the production of siderophores, which, in turn, make iron available to the animal.
(E) In warm-blooded animals, infections that lead to fever are usually traceable to bacteria.

27. If it were to be determined that "similar phenomena occur in warm-blooded animals" (lines 21-22), which of the following, assuming each is possible, is likely to be the most effective treatment for warm-blooded animals with bacterial infections?

(A) Administering a medication that lowers the animals' body temperature
(B) Injecting the animals with an iron solution
(C) Administering a medication that makes serum iron unavailable to bacteria
(D) Providing the animals with reduced-iron diets
(E) Keeping the animals in an environment with temperatures higher than 37° C

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Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. PERTAIN: (A) be apathetic (B) be illegitimate (C) be irrevocable (D) be incongruous (E) be irrelevant

29. FREQUENCY: (A) unity (B) rarity (C) gradualness (D) persistency (E) moderation

30. AMALGAMATE: (A) study (B) circulate (C) reduce (D) endure (E) separate

31. ARRHYTHMIC: (A) timely (B) subordinate (C) terminal (D) lacking precision (E) exhibiting regularity

32. BLITHE: (A) conceited (B) dim (C) sturdy (D) laconic (E) grave

33. POLEMICAL: (A) imitative (B) lavish (C) conciliatory (D) attractive (E) modest

34. PRECIPITATE: (A) deliberate (B) determined (C) dissident (D) desperate (E) divided

35. DEFERENCE: (A) aversion (B) resignation (C) suspicion (D) inattention (E) contempt

36. UNTOWARD: (A) direct (B) decisive (C) necessary (D) favorable and anticipated (E) confident and prepared

37. OPPROBRIOUS: (A) meretricious (B) innocuous (C) invulnerable (D) irreproachable (E) ambitious

38. VERITABLE: (A) impetuous (B) pernicious (C) inefficacious (D) disastrous (E) specious

SECTION 6

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage, graph, table, or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-4

Each of six automated tasks, numbered 1 through 6, takes one full hour to complete. No time elapses between the completion of any of the six tasks and the beginning of another task. The group of six tasks must be completed in the shortest possible time period, subject only to the following restrictions:

Tasks 1 and 2 must both be completed before any of the other tasks can be begun.
Task 3 must be completed before task 4 can be begun.
At any one time, no more than one task can be performed, except that tasks 4 and 5 can be performed concurrently.

1. Which of the following tasks could be the second task performed?

   (A) 2
   (B) 3
   (C) 4
   (D) 5
   (E) 6

2. The shortest possible time period in which the group of six tasks can be completed is

   (A) two hours
   (B) three hours
   (C) four hours
   (D) five hours
   (E) six hours

3. Which of the following CANNOT be true of any acceptable ordering of tasks?

   (A) Task 1 is performed before task 2.
   (B) Task 3 is performed before task 6.
   (C) Task 4 is performed before task 6.
   (D) Task 5 is performed before task 3.
   (E) Task 6 is performed before task 3.

4. If task 6 is performed as early in the order of tasks as is permissible, then task 6 is performed

   (A) first
   (B) second
   (C) third
   (D) fourth
   (E) fifth

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5. Most television viewers estimate how frequently a particular type of accident or crime occurs by how extensively it is discussed on television news shows. Television news shows report more on stories that include dramatic pictures such as fires and motor vehicle accidents than they do on more common stories that have little visual drama such as bookkeeping fraud.

   If the statements above are true, it can be properly concluded that which of the following is also true?

   (A) The time that television news reporters spend researching news stories is directly related to the number of viewers who will be affected by events like those in the news stories.
   (B) It is easier for crimes such as bookkeeping fraud to go unprosecuted than it is for crimes such as arson.
   (C) The number of fires and motor vehicle accidents greatly increases after each television news show that includes dramatic pictures of a fire or motor vehicle accident.
   (D) Viewers of television news shows tend to overestimate the number of fires and motor vehicle accidents that occur relative to the number of crimes of bookkeeping fraud.
   (E) The usual selection of news stories for television news shows is determined by the number of news reporters available for assignment.

6. According to one psychological theory, in order to be happy, one must have an intimate relationship with another person. Yet the world's greatest composers spent most of their time in solitude and had no intimate relationships. So the psychological theory must be wrong.

   The conclusion above assumes that

   (A) the world's greatest composers chose to avoid intimate relationships
   (B) people who have intimate relationships spend little time in solitude
   (C) solitude is necessary for the composition of great music
   (D) less well known composers had intimate relationships
   (E) the world's greatest composers were happy

7. Every member of the Progress party in a certain city council voted against appropriating funds to build a new bridge. All city council members voted on the bridge-appropriation issue. A simple majority of votes was needed to pass the bill.

   Which of the following statements, if true, would provide sufficient information to tell whether or not the bridge appropriation bill passed?

   (A) The Progress party holds a majority of seats on the city council.
   (B) Less than half of the members of the other parties all taken together voted against the bridge appropriation.
   (C) No other council members voted against the bridge appropriation.
   (D) Three-fourths of the votes cast against the appropriation were by members of the Progress party.
   (E) Every member of the city council is either a member of the Popular party or a member of the Progress party.

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Questions 8-13

An office is one of several in which all the furniture is to be repainted. The office contains exactly four pieces of furniture—a bookcase, two chairs, and a desk—and no furniture is to be moved into or out of that office. The repainting specifications are as follows:

On completion of repainting, any piece of furniture in an office must be uniformly brown, green, tan, or white.

On completion of repainting, at least one of the pieces of furniture in an office must be green, and the desk must be either brown or tan.

If, prior to repainting, a piece of furniture is either orange or yellow, that piece must be white on completion of repainting.

If, prior to repainting, a piece of furniture is tan, that piece must remain tan on completion of repainting.

All of the specifications above can and must be met in each office scheduled for repainting.

8. Which of the following could be the furniture colors in the office on completion of repainting?

	Bookcase	Chair	Chair	Desk
(A)	Yellow	Brown	White	Tan
(B)	White	Green	Green	Brown
(C)	Green	White	Orange	Brown
(D)	Brown	Tan	White	Tan
(E)	Tan	White	Brown	Green

9. If, prior to repainting, one chair in the office is orange and the other chair is tan, which of the following must be true of the furniture in the office on completion of repainting?

(A) The bookcase is green.
(B) Exactly one of the chairs is brown.
(C) Exactly one of the chairs is orange.
(D) Both of the chairs are white.
(E) The desk is tan.

10. If, prior to repainting, the desk in the office is green and the other three pieces of furniture are white, then of these four pieces of furniture there must be how many that are painted a color that differs from its color prior to repainting?

(A) Four
(B) Three
(C) Two
(D) One
(E) None

11. Prior to repainting, and given the repainting specifications, the desk in the office could have been any of the following colors EXCEPT

(A) brown
(B) gray
(C) tan
(D) white
(E) yellow

12. If, prior to repainting, the bookcase is white, one chair is orange, one chair is tan, and the desk is green, which of the following must be true of the furniture in the office on completion of repainting?

(A) At least one piece of furniture is brown.
(B) Only one piece of furniture is green.
(C) Only one piece of furniture is tan.
(D) Exactly two pieces of furniture are white.
(E) Exactly two pieces of furniture are changed in color as a result of repainting.

13. Which of the following could be true of the furniture in the office prior to repainting if, also prior to repainting, three of the pieces of furniture in the office are tan?

(A) The desk is brown.
(B) The desk is green.
(C) One piece of furniture is white.
(D) One piece of furniture is yellow.
(E) The fourth piece of furniture also is tan.

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Questions 14-18

At the start of a two-week hiking trip, eight women—Fiona, Gabriela, Judith, Karen, Michiko, Sharita, Teresa, and Yuriko—will divide into a River Group and a Hill Group of four members each. After following different trails for one week, the groups will meet and the women will again divide into a River Group and a Hill Group of four members each, which will again follow different trails for a week. The groups must be formed with the following restrictions:

For the first week, Teresa cannot be in the same group as Yuriko.
For the second week, both Teresa and Yuriko must be in the River Group.
For each of the two weeks, if Fiona is in the Hill Group, Karen must also be in the Hill Group.
For each of the two weeks, Judith must be in the same group as Michiko.

14. Which of the following could be the members of the River Group for the first week?

(A) Fiona, Gabriela, Karen, and Yuriko
(B) Fiona, Karen, Michiko, and Sharita
(C) Gabriela, Judith, Sharita, and Teresa
(D) Gabriela, Karen, Teresa, and Yuriko
(E) Gabriela, Sharita, Teresa, and Yuriko

15. If Michiko is in the River Group for the second week, which of the following must be the members of the Hill Group for that week?

(A) Fiona, Gabriela, Judith, and Sharita
(B) Fiona, Gabriela, Karen, and Sharita
(C) Gabriela, Judith, Karen, and Sharita
(D) Gabriela, Judith, Sharita, and Yuriko
(E) Judith, Karen, Teresa, and Yuriko

16. If, for each week, Sharita is in a different group from Teresa, Sharita must be in a group with which of the following for exactly one week?

(A) Fiona
(B) Gabriela
(C) Karen
(D) Michiko
(E) Yuriko

17. If Judith is in the Hill Group for the first week, which of the following must be in the River Group for that week?

(A) Fiona
(B) Gabriela
(C) Michiko
(D) Sharita
(E) Teresa

18. If exactly two women change groups at the end of the first week, those two women could be which of the following?

(A) Gabriela and Karen
(B) Gabriela and Sharita
(C) Karen and Sharita
(D) Karen and Yuriko
(E) Teresa and Yuriko

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Questions 19-22

An artist needs to arrange seven drawings on the wall of a room in an art gallery. The drawings must be placed in seven consecutive positions, numbered 1 through 7, along the wall. Four of the drawings—*Fan*, *Gate*, *Harp*, and *Iris*—depict objects, whereas three of the drawings—*Salem*, *Tempe*, and *Utah*—depict landscapes. The order in which the drawings are arranged along the wall must meet the following conditions:

No two drawings of objects can be placed next to each other.
Iris cannot immediately precede *Salem*.
Harp must immediately precede *Tempe*.
If *Gate* is in the third position, then *Salem* must be in the second position.

19. Which of the following is an acceptable arrangement of the drawings along the wall, from position 1 to position 7 ?

(A) *Fan*, *Salem*, *Gate*, *Tempe*, *Iris*, *Utah*, *Harp*
(B) *Harp*, *Tempe*, *Iris*, *Utah*, *Gate*, *Salem*, *Fan*
(C) *Iris*, *Utah*, *Gate*, *Fan*, *Salem*, *Harp*, *Tempe*
(D) *Salem*, *Fan*, *Utah*, *Harp*, *Tempe*, *Gate*, *Iris*
(E) *Utah*, *Salem*, *Gate*, *Harp*, *Tempe*, *Fan*, *Iris*

20. Which of the following lists the three positions on the wall in which *Harp* could be placed?

(A) First, second, and third
(B) First, third, and fifth
(C) Third, fourth, and fifth
(D) Third, fifth, and sixth
(E) Third, fifth, and seventh

21. If *Gate* is in the third position, *Utah* must be placed in which of the following positions?

(A) First
(B) Second
(C) Fourth
(D) Fifth
(E) Sixth

22. If *Salem* must be placed on the wall in a higher-numbered position than *Tempe* and in a lower-numbered position than *Utah*, *Fan* must be placed in which of the following positions?

(A) First
(B) Second
(C) Third
(D) Fourth
(E) Fifth

GO ON TO THE NEXT PAGE.

23. A common defense of sport hunting is that it serves a vital wildlife-management function, without which countless animals would succumb to starvation and disease. This defense leads to the overly hasty conclusion that sport hunting produces a healthier population of animals.

Which of the following, if true, best supports the author's claim that sport hunting does not necessarily produce a healthier population of animals?

(A) For many economically depressed families, hunting helps keep food on the table.
(B) Wildlife species encroach on farm crops when other food supplies become scarce.
(C) Overpopulation of a species causes both strong and weak animals to suffer.
(D) Sport hunters tend to pursue the biggest and healthiest animals in a population.
(E) Many people have strong moral objections to killing a creature for any reason other than self-defense.

24. Two suits of battle armor worn by King Henry VIII were discovered, one from the beginning of his reign in 1510 and the other from 1540. Although both suits of armor were made for Henry VIII, the 1540 suit of armor was 40 pounds heavier than the 1510 suit of armor.

Which of the following, if true, contributes LEAST to an explanation of the discrepancy described above?

(A) Henry, although slim at the beginning of his reign, developed a bulky figure because of massive weight gain.
(B) During his reign Henry increased his arsenal of weapons because, despite his popularity in 1510, by 1540 the English populace was becoming disenchanted with his rule.
(C) Although the style of armor was plain and severe in the beginning of Henry's reign, he started the fashion of decorating armor with heavy and elaborate metal pieces because of his love for ornamentation.
(D) Henry ascended the throne while still an adolescent and grew three inches during his first five years as king.
(E) Because of the improved design of battle weaponry during the 1530's, armor was given a multilayered design so that the sharper and stronger weapons could not pierce it.

25. Government department head: We already have a code of ethics that companies doing business with the department are urged to abide by. The fact that virtually all of the companies have agreed to abide by it indicates that it is successful. Therefore, neither stronger ethics regulations nor enforcement mechanisms are necessary to ensure ethical behavior by companies doing business with the department.

Which of the following, if true, casts most doubt on the department head's conclusion?

(A) The code of ethics applies only to companies that do business with the department.
(B) The code of ethics was instituted only after it was discovered that several companies had committed serious violations of ethics in their business with the department.
(C) A government investigation found that most of the companies that agreed to abide by the department's code of ethics are not complying with it.
(D) A survey of major companies found that several companies stopped doing business with the department because they did not want to agree to abide by the code of ethics.
(E) A study of codes of ethics for companies found that the codes are most effective when the top executives of companies that agree to abide by them are fully committed to following them.

SECTION 7

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

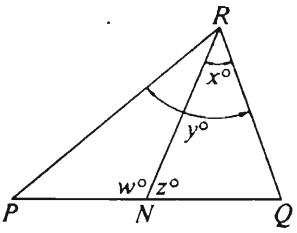
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

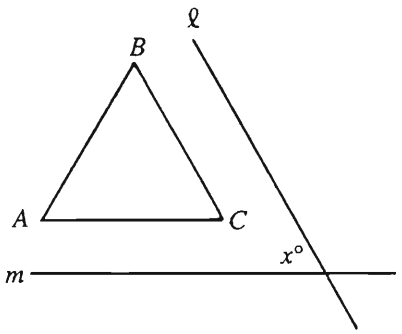
Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	The number of months in 7 years	The number of days in 12 weeks
2.	$1 - \frac{1}{27}$	$\frac{8}{9} + \frac{1}{81}$



$\triangle ABC$ is equilateral. Line ℓ is parallel to side BC and line m is parallel to side AC.

3.	x	60

$r > s > 0$

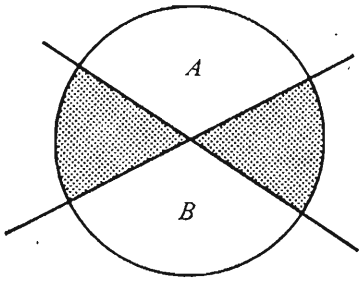
4.	$\frac{rs}{r}$	$\frac{rs}{s}$

	Column A	Column B
	The circumference of circle C is 18π.	
5.	The diameter of circle C	9
6.	9^7	10,000,000
	The volume of a cube is 64.	
7.	The area of the base of the cube	32
	t is a positive integer. $\frac{4}{7} = \frac{t}{s}$	
8.	s	7
9.	$(0.82)^2(0.82)^3$	$(0.82)^6$
	For all real numbers a, let $a^* = 1 - a$.	
10.	$((-1)^*)^*$	2^*

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Column A	Column B



The areas of the two shaded regions of the circle are equal.

11. The area of unshaded region A of the circle | The area of unshaded region B of the circle

$x \neq 0$

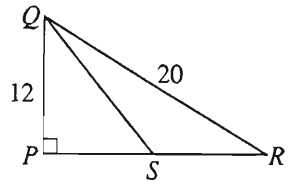
12. $\frac{x}{|x|}$ | 1

Column A	Column B

Team X scored p points more than team Y, and the two teams together scored a total of 10 points.

13. Twice the number of points team Y scored | $10 - p$

14. $(x - 1)(x)(x + 1)$ | $(x)(x)(x)$



The area of $\triangle PQS$ is 45.

15. The length of segment PS | The length of segment SR

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

---

16. In a certain shop, notebooks that normally sell for 59 cents each are on sale at 2 for 99 cents. How much can be saved by purchasing 10 of these notebooks at the sale price?

(A) \$0.85
(B) \$0.95
(C) \$1.10
(D) \$1.15
(E) \$2.00

17. Which of the following is a solution to $x + x^2 = 1$?

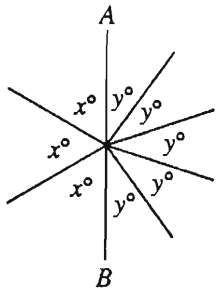
(A) -1

(B) 0

(C) $\frac{1}{2}$

(D) 1

(E) None of the above



18. In the figure above, AB is a line segment. What is the value of $\frac{x - y}{x + y}$?

(A) $\frac{5}{24}$

(B) $\frac{1}{4}$

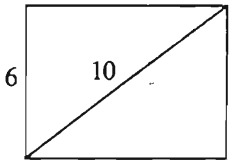
(C) $\frac{7}{16}$

(D) $\frac{11}{24}$

(E) $\frac{7}{13}$

19. If the average (arithmetic mean) of 5 consecutive integers is 12, what is the sum of the least and greatest of the 5 integers?

(A) 24
(B) 14
(C) 12
(D) 11
(E) 10



20. What is the perimeter of the rectangle shown above?

(A) 14
(B) 24
(C) 28
(D) 38
(E) 48

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following chart.

PROFILE OF CONGRESS IN YEAR X
(total membership: 535)

House of Representatives		Senate
	Party	
292	Democratic	62
143	Republican	38
435	Total	100
	Sex	
418	Male	100
17	Female	0
	Age	
27	Youngest	34
77	Oldest	80
48	Average (arithmetic mean)	54
	Religion	
255	Protestant	69
107	Catholic	12
18	Jewish	5
4	Mormon	3
51	Other	11

House of Representatives		Senate
	Profession	
215	Lawyer	63
81	Business Executive or Banker	15
45	Educator	6
14	Farmer or Rancher	6
22	Career Government Official	0
24	Journalist or Communications Executive	4
2	Physician	0
1	Veterinarian	1
0	Geologist	2
6	Worker or Skilled Tradesperson	0
25	Other	3
	Ethnic Group	
17	Black American	1
2	Asian American	3
4	Hispanic American	0

GO ON TO THE NEXT PAGE.

21. In the Senate, if 25 male members were replaced by 25 female members, the ratio of male members to female members would be

(A) 4 to 1
(B) 3 to 1
(C) 3 to 2
(D) 2 to 1
(E) 1 to 1

22. Approximately what percent of the members of Congress are lawyers?

(A) 63%
(B) 58%
(C) 56%
(D) 52%
(E) 49%

23. If 5 senators are Catholic Democrats, how many senators are neither Catholic nor Democratic?

(A) 79
(B) 74
(C) 69
(D) 31
(E) 21

24. If all lawyers and all women in the House of Representatives vote for the passage of a bill, how many more votes will be needed for a majority?

(A) 435
(B) 220
(C) 3
(D) 0
(E) It cannot be determined from the information given.

25. Which of the following can be inferred from the information given in the chart?

I. More than 80 percent of the men in Congress are members of the House of Representatives.
II. The percent of members who are categorized as farmers or ranchers is greater for the House of Representatives than for the Senate.
III. The median age in the Senate is 57.

(A) I only
(B) II only
(C) III only
(D) I and II
(E) I and III

GO ON TO THE NEXT PAGE.

26. If $xy \neq 0$, $\frac{x-1}{xy} =$

(A) $\frac{1}{x} - \frac{1}{xy}$

(B) $\frac{x}{y} - \frac{1}{xy}$

(C) $\frac{1}{y} - x$

(D) $\frac{1}{y} - \frac{1}{xy}$

(E) $\frac{1}{xy} - \frac{1}{y}$

27. The number 0.01 is how many times as great as the number $(0.0001)^2$?

(A) 10^2

(B) 10^4

(C) 10^6

(D) 10^8

(E) 10^{10}

28. A certain cake recipe states that the cake should be baked in a pan 8 inches in diameter. If Jules wants to use the recipe to make a cake of the same depth but 12 inches in diameter, by what factor should he multiply the recipe ingredients?

(A) $2\frac{1}{2}$

(B) $2\frac{1}{4}$

(C) $1\frac{1}{2}$

(D) $1\frac{4}{9}$

(E) $1\frac{1}{3}$

29. If $x > 0$ and $y > 0$, which of the following is equivalent to $\frac{x}{y}\sqrt{\frac{y}{x^2}}$?

(A) 1

(B) $\frac{\sqrt{x}}{\sqrt{y}}$

(C) $\sqrt{x}$

(D) $\frac{1}{\sqrt{x}}$

(E) $\frac{1}{\sqrt{y}}$

30. The cost, in dollars, of manufacturing x refrigerators is $9{,}000 + 400x$. The amount received when selling these x refrigerators is $500x$ dollars. What is the least number of refrigerators that must be manufactured and sold so that the amount received is at least equal to the manufacturing cost?

(A) 10
(B) 18
(C) 45
(D) 90
(E) 100

FOR GENERAL TEST 1 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 1			Section 4		
Number	Answer	P+	Number	Answer	P+
1	A	90	1	A	84
2	B	82	2	E	86
3	B	81	3	B	87
4	E	77	4	C	80
5	D	70	5	A	74
6	C	62	6	B	71
7	C	28	7	C	68
8	D	96	8	C	98
9	C	85	9	D	76
10	C	46	10	C	70
11	A	46	11	B	63
12	D	46	12	A	60
13	A	39	13	B	48
14	E	36	14	B	48
15	E	35	15	D	26
16	A	26	16	D	35
17	C	63	17	A	58
18	B	63	18	D	97
19	A	64	19	B	89
20	C	75	20	D	51
21	E	64	21	B	66
22	D	46	22	A	33
23	D	51	23	B	48
24	B	62	24	C	74
25	A	59	25	D	70
26	E	52	26	A	51
27	B	66	27	C	48
28	E	89	28	E	89
29	A	86	29	B	87
30	E	76	30	E	69
31	B	78	31	E	58
32	C	41	32	E	30
33	E	37	33	C	44
34	D	36	34	A	25
35	C	35	35	E	31
36	A	29	36	D	36
37	A	18	37	D	25
38	D	21	38	E	19

QUANTITATIVE ABILITY					
Section 3			Section 7		
Number	Answer	P+	Number	Answer	P+
1	A	85	1	C	94
2	C	84	2	A	80
3	B	79	3	C	85
4	D	76	4	B	76
5	C	57	5	A	64
6	D	70	6	B	67
7	B	69	7	B	72
8	D	52	8	D	69
9	B	52	9	A	34
10	A	50	10	C	38
11	A	42	11	D	19
12	D	26	12	D	59
13	C	57	13	C	42
14	B	52	14	D	28
15	A	35	15	B	40
16	E	75	16	B	88
17	E	86	17	E	80
18	D	81	18	B	77
19	A	83	19	A	74
20	B	63	20	C	71
21	B	92	21	B	84
22	C	90	22	D	58
23	B	71	23	D	54
24	E	58	24	E	63
25	D	71	25	A	34
26	C	47	26	D	51
27	D	32	27	C	52
28	E	44	28	B	32
29	A	19	29	E	49
30	E	47	30	D	57

ANALYTICAL ABILITY					
Section 2			Section 6		
Number	Answer	P+	Number	Answer	P+
1	C	88	1	A	91
2	C	87	2	D	81
3	E	92	3	D	72
4	E	86	4	C	83
5	C	81	5	D	79
6	A	65	6	E	75
7	A	45	7	A	76
8	B	89	8	B	76
9	B	66	9	A	70
10	E	52	10	C	59
11	C	81	11	E	56
12	D	89	12	B	48
13	D	68	13	C	34
14	A	47	14	A	67
15	A	44	15	B	78
16	B	62	16	E	58
17	A	45	17	A	26
18	B	50	18	D	25
19	D	37	19	B	60
20	D	60	20	B	54
21	D	23	21	C	55
22	E	30	22	C	40
23	B	54	23	D	69
24	C	51	24	B	56
25	E	30	25	C	60

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 1 ONLY AND THE PERCENTS BELOW*

Raw Score	Verbal Scaled Score	Verbal % Below	Quantitative Scaled Score	Quantitative % Below	Analytical Scaled Score	Analytical % Below	Raw Score	Verbal Scaled Score	Verbal % Below	Quantitative Scaled Score	Quantitative % Below	Analytical Scaled Score	Analytical % Below
74-76	800	99					39	430	34	610	60	660	81
73	790	99					38	420	31	600	58	640	77
72	780	99					37	410	28	580	53	630	73
71	760	99					36	400	25	570	51	610	69
70	750	98					35	390	22	560	48	590	63
							34	380	20	550	46	580	60
69	740	98					33	380	20	540	43	560	55
68	730	97					32	370	17	530	41	550	52
67	720	96					31	360	15	520	39	530	46
66	710	96					30	350	13	500	34	520	43
65	700	95											
64	680	93					29	340	11	490	32	500	37
63	670	92					28	340	11	480	30	490	35
62	660	90					27	330	9	470	27	480	32
61	650	89					26	320	8	450	23	460	28
60	640	87	800	97			25	310	6	440	21	450	25
							24	310	6	420	17	430	21
59	630	86	800	97			23	300	5	410	15	420	19
58	620	84	800	97			22	290	4	390	12	400	15
57	600	81	800	97			21	280	3	380	11	390	13
56	590	79	790	95			20	280	3	370	9	380	12
55	580	76	780	93									
54	570	74	770	92			19	270	2	350	7	360	9
53	560	71	760	90			18	260	2	340	6	350	8
52	550	69	740	86			17	260	2	320	4	330	6
51	540	66	730	84			16	250	1	300	3	320	5
50	540	66	720	82	800	98	15	240	1	290	2	310	4
							14	230	1	270	1	300	3
							13	220	1	260	1	290	3
49	530	64	710	80	800	98	12	210	1	240	1	270	2
48	520	61	700	79	800	98	11	210	1	220	1	260	1
47	510	58	690	76	780	97	10	200	1	200	1	240	1
46	490	53	680	75	760	96							
45	480	50	670	73	750	95	9	200	1	200	1	230	1
44	470	47	660	70	730	93	8	200	1	200	1	220	1
43	460	43	650	68	710	90	7	200	1	200	1	200	1
42	460	43	640	66	700	89	6	200	1	200	1	200	1
41	450	40	630	64	680	85	5	200	1	200	1	200	1
40	440	37	620	62	670	83	0-4	200	1	200	1	200	1

*Percent scoring below the scaled score is based on the performance of 1,135,982 examinees who took the General Test between October 1, 1989, and September 30, 1992. This percent below information is used for score reports during the 1993-94 testing year.

TEST 2

SECTION 1

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. In the British theater young people under thirty-five have not had much ------- getting recognition onstage, but offstage—in the ranks of playwrights, directors, designers, administrators—they have mostly been relegated to relative obscurity.

   (A) trouble (B) satisfaction (C) curiosity about (D) success at (E) fear of

2. An institution concerned about its reputation is at the mercy of the actions of its members, because the misdeeds of individuals are often used to ------- the institutions of which they are a part.

   (A) reform (B) coerce (C) honor (D) discredit (E) intimidate

3. Since many casual smokers develop lung cancer and many -------- smokers do not, scientists believe that individuals differ in their -------- the cancer-causing agents known to be present in cigarette smoke.

   (A) heavy. .susceptibility to
   (B) chronic. .concern about
   (C) habitual. .proximity to
   (D) devoted. .reliance upon
   (E) regular. .exposure to

4. We accepted the theory that as people become more independent of one another, they begin to feel so isolated and lonely that freedom becomes ------- condition that most will seek to -------.

   (A) a permanent. .postpone
   (B) a common. .enter
   (C) a negative. .escape
   (D) a political. .impose
   (E) an irreparable. .avoid

5. If animal parents were judged by human standards, the cuckoo would be one of nature's more ------- creatures, blithely laying its eggs in the nests of other birds, and leaving the incubating and nurturing to them.

   (A) mettlesome (B) industrious (C) domestic (D) lackluster (E) feckless

6. The current penchant for ------- a product by denigrating a rival, named in the advertisement by brand name, seems somewhat -------: suppose the consumer remembers only the rival's name?

   (A) criticizing. .inefficient
   (B) touting. .foolhardy
   (C) enhancing. .insipid
   (D) evaluating. .cumbersome
   (E) flaunting. .gullible

7. His imperturbability in the face of evidence indicating his deliberate fraud failed to reassure supporters of his essential ------- ; instead, it suggested a talent for ------- that they had never suspected.

   (A) culpability. .intrigue (B) wisdom. .reproof (C) remorse. .loquacity (D) probity. .guile (E) combativeness. .compromise

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. JUDGE : GAVEL ::
   (A) detective : uniform
   (B) doctor : stethoscope
   (C) referee : whistle
   (D) soldier : insignia
   (E) lecturer : podium

9. ORGAN : KIDNEY ::
   (A) skeleton : kneecap
   (B) bone : rib
   (C) neuron : synapse
   (D) abdomen : stomach
   (E) blood : aorta

10. SOOT : COMBUSTION ::
   (A) lint : brushing
   (B) gravel : crushing
   (C) gristle : tenderizing
   (D) rubbish : housecleaning
   (E) sawdust : woodcutting

11. PURIFY : IMPERFECTION ::
   (A) align : adjustment
   (B) weary : boredom
   (C) disagree : controversy
   (D) verify : doubtfulness
   (E) hone : sharpness

12. CENTRIFUGE : SEPARATE ::
   (A) thermometer : calibrate
   (B) statue : chisel
   (C) floodgate : overflow
   (D) colander : drain
   (E) television : transmit

13. MOCK : IMITATE
   (A) satirize : charm
   (B) condense : summarize
   (C) placate : assuage
   (D) adapt : duplicate
   (E) taunt : challenge

14. MALADROIT : SKILL ::
   (A) intemperate : anger
   (B) unreasonable : intuition
   (C) sluggish : fatigue
   (D) glib : profundity
   (E) morose : depression

15. EQUIVOCATION : AMBIGUOUS ::
   (A) mitigation : severe
   (B) contradiction : peremptory
   (C) platitude : banal
   (D) precept : obedient
   (E) explanation : unintelligible

16. VOLATILE : TEMPER ::
   (A) prominent : notoriety
   (B) ready : wit
   (C) catastrophic : disaster
   (D) gentle : heart
   (E) expressive : song

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

(This passage is from an article published in 1973)

The recent change to all-volunteer armed forces in the United States will eventually produce a gradual increase in the proportion of women in the armed forces and in the variety of women's assignments, but probably not the dramatic gains for women that might have been expected. This is so even though the armed forces operate in an ethos of institutional change oriented toward occupational equality and under the federal sanction of equal pay for equal work. The difficulty is that women are unlikely to be trained for any direct combat operations. A significant portion of the larger society remains uncomfortable as yet with extending equality in this direction. Therefore, for women in the military, the search for equality will still be based on functional equivalence, not identity or even similarity of task. Opportunities seem certain to arise. The growing emphasis on deterrence is bound to offer increasing scope for women to become involved in novel types of noncombat military assignments.

17. The primary purpose of the passage is to
    (A) present an overview of the different types of assignments available to women in the new United States all-volunteer armed forces
    (B) present a reasoned prognosis of the status of women in the new United States all-volunteer armed forces
    (C) present the new United States all-volunteer armed forces as a model case of equal employment policies in action
    (D) analyze reforms in the new United States all-volunteer armed forces necessitated by the increasing number of women in the military
    (E) analyze the use of functional equivalence as a substitute for occupational equality in the new United States all-volunteer armed forces

18. According to the passage, despite the United States armed forces' commitment to occupational equality for women in the military, certain other factors preclude women's
    (A) receiving equal pay for equal work
    (B) having access to positions of responsibility at most levels
    (C) drawing assignments from a wider range of assignments than before
    (D) benefiting from opportunities arising from new noncombat functions
    (E) being assigned all of the military tasks that are assigned to men

19. The passage implies that which of the following is a factor conducive to a more equitable representation of women in the United States armed forces than has existed in the past?
    (A) The all-volunteer character of the present armed forces
    (B) The past service records of women who had assignments functionally equivalent to men's assignments
    (C) The level of awareness on the part of the larger society of military issues
    (D) A decline in the proportion of deterrence-oriented noncombat assignments
    (E) Restrictive past policies governing the military assignments open to women

20. The "dramatic gains for women" (line 5) and the attitude, as described in lines 11-12, of a "significant portion of the larger society" are logically related to each other inasmuch as the author puts forward the latter as
    (A) a public response to achievement of the former
    (B) the major reason for absence of the former
    (C) a precondition for any prospect of achieving the former
    (D) a catalyst for a further extension of the former
    (E) a reason for some of the former being lost again

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Of the thousands of specimens of meteorites found on Earth and known to science, only about 100 are igneous; that is, they have undergone melting by volcanic action at some time since the planets were first formed. These igneous meteorites are known as achondrites because they lack chondrules— small stony spherules found in the thousands of meteorites (called "chondrites") composed primarily of unaltered minerals that condensed from dust and gas at the origin of the solar system. Achondrites are the only known samples of volcanic rocks originating outside the Earth-Moon system. Most are thought to have been dislodged by interbody impact from asteroids, with diameters of from 10 to 500 kilometers, in solar orbit between Mars and Jupiter.

Shergottites, the name given to three anomalous achondrites so far discovered on Earth, present scientists with a genuine enigma. Shergottites crystallized from molten rock less than 1.1 billion years ago (some 3.5 billion years later than typical achondrites) and were presumably ejected into space when an object impacted on a body similar in chemical composition to Earth.

While most meteorites appear to derive from comparatively small bodies, shergottites exhibit properties that indicate that their source was a large planet, conceivably Mars. In order to account for such an unlikely source, some unusual factor must be invoked, because the impact needed to accelerate a fragment of rock to escape the gravitational field of a body even as small as the Moon is so great that no meteorites of lunar origin have been discovered.

While some scientists speculate that shergottites derive from Io (a volcanically active moon of Jupiter), recent measurements suggest that since Io's surface is rich in sulfur and sodium, the chemical composition of its volcanic products would probably be unlike that of the shergottites. Moreover, any fragments dislodged from Io by interbody impact would be unlikely to escape the gravitational pull of Jupiter.

The only other logical source of shergottites is Mars. Space-probe photographs indicate the existence of giant volcanoes on the Martian surface. From the small number of impact craters that appear on Martian lava flows, one can estimate that the planet was volcanically active as recently as a half-billion years ago—and may be active today. The great objection to the Martian origin of shergottites is the absence of lunar meteorites on Earth. An impact capable of ejecting a fragment of the Martian surface into an Earth-intersecting orbit is even less probable than such an event on the Moon, in view of the Moon's smaller size and closer proximity to Earth. A recent study suggests, however, that permafrost ices below the surface of Mars may have altered the effects of impact on it. If the ices had been rapidly vaporized by an impacting object, the expanding gases might have helped the ejected fragments reach escape velocity. Finally, analyses performed by space probes show a remarkable chemical similarity between Martian soil and the shergottites.

21. The passage implies which of the following about shergottites?

I. They are products of volcanic activity.
II. They derive from a planet larger than Earth.
III. They come from a planetary body with a chemical composition similar to that of Io.

(A) I only
(B) II only
(C) I and II only
(D) II and III only
(E) I, II, and III

22. According to the passage, a meteorite discovered on Earth is unlikely to have come from a large planet for which of the following reasons?

(A) There are fewer large planets in the solar system than there are asteroids.
(B) Most large planets have been volcanically inactive for more than a billion years.
(C) The gravitational pull of a large planet would probably prohibit fragments from escaping its orbit.
(D) There are no chondrites occurring naturally on Earth and probably none on other large planets.
(E) Interbody impact is much rarer on large than on small planets because of the density of the atmosphere on large planets.

23. The passage suggests that the age of shergottites is probably

(A) still entirely undetermined
(B) less than that of most other achondrites
(C) about 3.5 billion years
(D) the same as that of typical achondrites
(E) greater than that of the Earth

GO ON TO THE NEXT PAGE.

24. According to the passage, the presence of chondrules in a meteorite indicates that the meteorite

(A) has probably come from Mars
(B) is older than the solar system itself
(C) has not been melted since the solar system formed
(D) is certainly less than 4 billion years old
(E) is a small fragment of an asteroid

25. The passage provides information to answer which of the following questions?

(A) What is the precise age of the solar system?
(B) How did shergottites get their name?
(C) What are the chemical properties shared by shergottites and Martian soils?
(D) How volcanically active is the planet Jupiter?
(E) What is a major feature of the Martian surface?

26. It can be inferred from the passage that each of the following is a consideration in determining whether a particular planet is a possible source of shergottites that have been discovered on Earth EXCEPT the

(A) planet's size
(B) planet's distance from Earth
(C) strength of the planet's field of gravity
(D) proximity of the planet to its moons
(E) chemical composition of the planet's surface

27. It can be inferred from the passage that most meteorites found on Earth contain which of the following?

(A) Crystals (B) Chondrules (C) Metals
(D) Sodium (E) Sulfur

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. LIMP: (A) true (B) firm (C) clear (D) stark (E) endless

29. GLOBAL: (A) local (B) unusual (C) unpredictable (D) hot-headed (E) single-minded

30. STABILITY: (A) disparity (B) inconstancy (C) opposition (D) carelessness (E) weariness

31. DILATE: (A) narrow (B) strengthen (C) bend (D) push (E) soften

32. CONSOLE: (A) pretend sympathy (B) reveal suffering (C) aggravate grief (D) betray (E) vilify

33. EXCULPATE: (A) attribute guilt (B) avoid responsibility (C) establish facts (D) control hostilities (E) show anxiety

34. ACCRETION:
(A) ingestion of a nutrient
(B) loss of the security on a loan
(C) discernment of subtle differences
(D) reduction in substance caused by erosion
(E) sudden repulsion from an entity

35. CADGE: (A) conceal (B) influence (C) reserve (D) earn (E) favor

36. ABJURE: (A) commingle (B) arbitrate (C) espouse (D) appease (E) pardon

37. SPECIOUS: (A) unfeigned (B) significant (C) valid (D) agreeable (E) restricted

38. QUOTIDIAN: (A) extraordinary (B) certain (C) wishful (D) secret (E) premature

SECTION 2

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

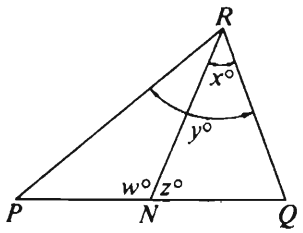
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	0.8	$\frac{1}{2} + \frac{1}{3}$

Pat is older than Lee, and Lee is younger than Maria.

2.	Maria's age	Pat's age

A farmer has two large plots of land that are equal in area. The first is divided into 16 parcels with n acres in each and the second is divided into 20 parcels with m acres in each.

3.	n	m

$x > 1$

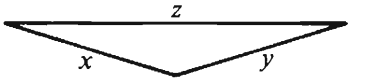
4.	$x - 4$	-2

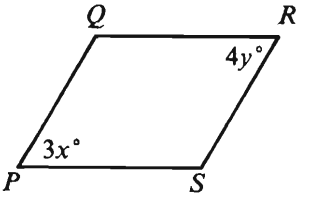
Rectangular region R has width 8 and perimeter 40.

5.	The area of R	256
6.	$4n^2$	$(2n + 1)(2n - 1)$

a and b are both greater than 0 and less than 1.

7.	$a^2 + b^2$	$a + b$

	Column A	Column B
8.	 $x + y$	z
9.	3^x	4^x



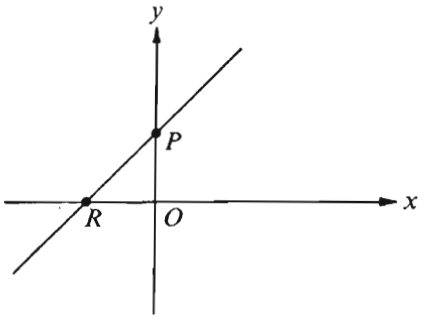
$PQRS$ is a parallelogram.

10.	x	y
11.	The sum of all the integers from 19 to 59, inclusive	The sum of all the integers from 22 to 60, inclusive

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B



The equation of the line graphed on the rectangular coordinate system above is:

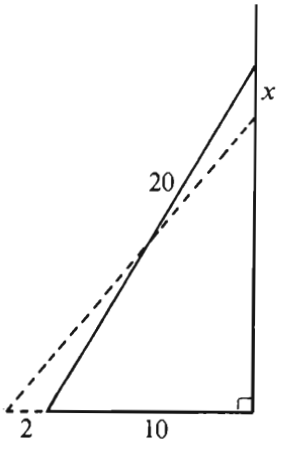
$$y = \frac{8x}{9} + 3$$

12.	PO	RO

$$0 > a > b$$

13.	ab	$(ab)^2$

	Column A	Column B



A 20-foot ladder leaning against a vertical wall with the base of the ladder 10 feet from the wall is pulled 2 feet farther out from the wall, causing the top of the ladder to drop x feet.

14.	x	2

15.	$\frac{99^9}{9^{99}}$	$\frac{11^9}{9^{90}}$

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Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. If the sales tax on an appliance priced at \$300 is between 5 percent and 8 percent, then the cost (price plus sales tax) of the appliance could be

(A) \$310
(B) \$312
(C) \$314
(D) \$318
(E) \$325

17. $2[2x + (3x + 5x)] - (3x + 5x) =$

(A) $4x$
(B) $8x$
(C) $10x$
(D) $12x$
(E) $22x$

18. Which of the following is the product of two positive integers whose sum is 3 ?

(A) 0
(B) 1
(C) 2
(D) 3
(E) 4

19. If an integer y is subtracted from an integer x and the result is greater than x, then y must be

(A) equal to x
(B) less than 0
(C) less than x
(D) greater than 0
(E) greater than x

20. A circle with radius 2 is intersected by a line at points R and T. The maximum possible distance between R and T is

(A) 1
(B) 2
(C) π
(D) 4
(E) 4π

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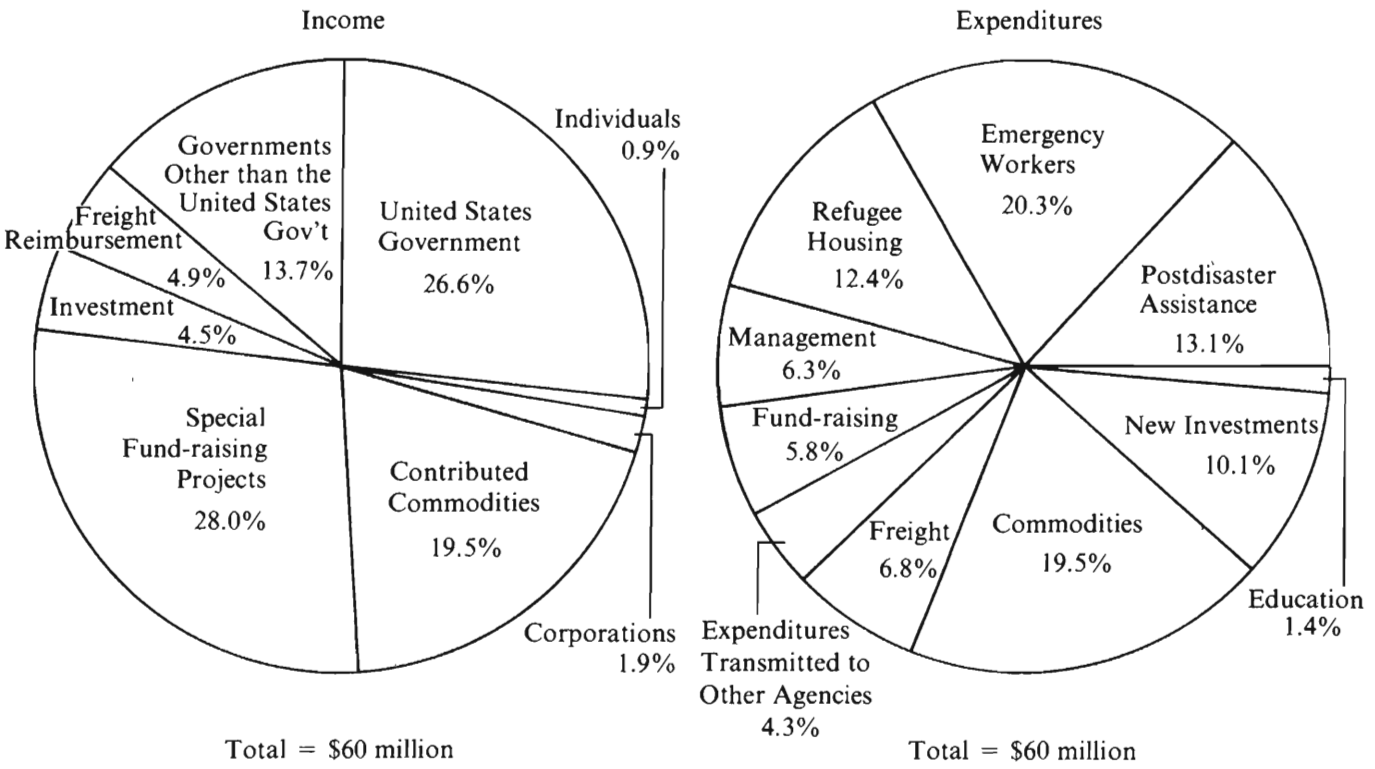
Questions 21-25 refer to the following graphs.

INCOME AND EXPENDITURES OF AN INTERNATIONAL SERVICE AGENCY—YEAR *X*



Note: Drawn to scale.

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21. Approximately how much of the agency's income was provided by contributed commodities?

(A) $12 million
(B) $14 million
(C) $15 million
(D) $17 million
(E) $19 million

22. Of the following, the category that had expenditures most nearly equal to the average (arithmetic mean) expenditures per category was

(A) refugee housing
(B) emergency workers
(C) postdisaster assistance
(D) new investments
(E) commodities

23. Income from which of the following sources was most nearly equal to $2.9 million?

(A) United States government
(B) Freight reimbursement
(C) Investment
(D) Individuals
(E) Corporations

24. In year X, $\frac{1}{3}$ of the agency's refugee housing expenditures, $\frac{1}{5}$ of its emergency workers expenditures, $\frac{1}{4}$ of its commodities expenditures, and $\frac{2}{3}$ of its postdisaster assistance expenditures were directly related to one earthquake. The total of these expenditures was approximately how many millions of dollars?

(A) 5
(B) 7
(C) 9
(D) 11
(E) 13

25. Of the following, which is the closest approximation to the percent of freight expenditures NOT covered by freight reimbursement income?

(A) 12%
(B) 28%
(C) 35%
(D) 39%
(E) 72%

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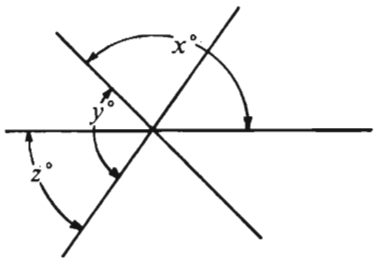
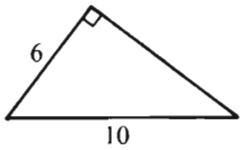


26. In the figure above, if $x = 110$ and $y = 120$, then $z =$

(A) 10
(B) 40
(C) 50
(D) 60
(E) 70



27. What is the area of the triangular region above?

(A) 24
(B) 30
(C) 40
(D) 48
(E) 60

28. A widow received $\frac{1}{3}$ of her husband's estate, and each of her three sons received $\frac{1}{3}$ of the balance. If the widow and one of her sons received a total of \$60,000 from the estate, what was the amount of the estate?

(A) \$90,000
(B) \$96,000
(C) \$108,000
(D) \$135,000
(E) \$180,000

29. If $\frac{x+2}{y-3} = 0$, which of the following must be true?

(A) $x = 2$ and $y = 3$
(B) $x = 2$ and $y \neq 3$
(C) $x = 0$ and $y = 0$
(D) $x = -2$ and $y = 3$
(E) $x = -2$ and $y \neq 3$

30. If $x = 0.888$, $y = \sqrt{0.888}$, and $z = (0.888)^2$, then which of the following is true?

(A) $x < y < z$
(B) $x < z < y$
(C) $y < x < z$
(D) $y < z < x$
(E) $z < x < y$

SECTION 3

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-6

A circus manager must divide eight circus acts—F, L, M, O, R, T, X, and Z—into two groups of four acts each, one group scheduled to perform, one act at a time, in ring 1 and the other group scheduled to perform, also one act at a time, in ring 2. All acts take equally long to perform, and every act that takes place in one of the rings must be scheduled for exactly the same time slot as an act that takes place in the other ring. The schedule must also conform to the following conditions:

Act F must take place in one of the rings at the same time that act M takes place in the other ring.
Act L must take place in one of the rings at the same time that act O takes place in the other ring.
Act R must take place in the same ring as act F.
Act T must take place in the same ring as act O.
Act X must be the second act that takes place in ring 2.

1. Which of the following, without regard to the order in which they will be performed, could be the group of acts to be scheduled for performance in ring 1 ?

(A) F, L, M, and T
(B) F, L, O, and R
(C) L, M, O, and T
(D) M, O, T, and Z
(E) O, R, T, and Z

2. If act T performs in ring 1, which of the following acts must perform in ring 2 ?

(A) F
(B) L
(C) M
(D) R
(E) Z

3. If act R must perform in one of the rings at the same time that act T performs in the other ring, which of the following must be the second act in ring 1 ?

(A) F
(B) L
(C) M
(D) O
(E) Z

4. If the order, from first to last, of circus acts in ring 2 is O, X, T, M, which of the following is an acceptable order of acts in ring 1, also from first to last?

(A) F, R, L, Z
(B) L, Z, F, R
(C) L, Z, R, F
(D) Z, L, F, R
(E) Z, R, L, F

5. If act F must perform between act X and act R in ring 2, which of the following must be the first act in ring 1 ?

(A) L
(B) M
(C) O
(D) T
(E) Z

6. If act T must take place in ring 1 immediately after act F and immediately before act R, which act must be the third act in ring 2 ?

(A) L
(B) M
(C) O
(D) T
(E) Z

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7. The federal government expects hospitals to perform 10,000 organ transplants next year. But it is doubtful that this many donor organs will be available, since the number of fatalities resulting from car and motorcycle accidents has been dropping steadily over the past decade.

   The argument above makes which of the following assumptions?

   (A) A significant number of the organs used in transplants come from people who die in car and motorcycle accidents.
   (B) The number of car and motorcycle accidents will increase significantly during the next year.
   (C) No more than 10,000 people will be in need of organ transplants during the next year.
   (D) In the past the federal government's estimates of the number of organ transplants needed during a given year have been very unreliable.
   (E) For any given fatality resulting from a car or motorcycle accident, there is a hospital in the vicinity in need of an organ for a transplant.

8. Verbal patterns in four works known to be written by a certain author were compared to those in a work of uncertain authorship sometimes attributed to that author. Many patterns were studied, including frequency of specific words and recurrence of certain phrases. The questioned work displayed verbal patterns very similar to those in the other four works, establishing that the same author wrote all five.

   Which of the following, if true, most strengthens the conclusion above?

   (A) No two writers are likely to display similar verbal patterns in their works.
   (B) Writers from different historical periods sometimes use the same words and phrases, but the meanings of such words and phrases change over time.
   (C) Many writers consciously attempt to experiment with innovative verbal patterns in each new work.
   (D) A relatively small number of words in any language occur with great frequency, and those words make up the largest portion of all discourse.
   (E) Word choice is generally considered an insignificant component of an author's style.

9. Because incumbent members of Congress are given a great deal of attention by the news media and because they enjoy such perquisites as free mail privileges and generous travel allowances, incumbents enjoy an overwhelming advantage over their challengers in elections for the United States Congress.

   Which of the following, if true, best supports the claim above?

   (A) In the last congressional elections, incumbents met with a larger number of lobbyists than did challengers.
   (B) In the last congressional elections, 98 percent of the incumbents in the House of Representatives who were seeking reelection won.
   (C) Incumbent members of Congress are frequently critical of the amount of attention given to them by the news media.
   (D) The support that political action committees provide to challengers for congressional seats often compensates for the perquisites enjoyed by incumbent members of Congress.
   (E) Of all incumbent senators surveyed before the last congressional elections, 78 percent said that their challengers did not pose a serious threat to their chances for reelection.

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Questions 10-14

In a display of products available from a paper manufacturer, exactly eight folders are to be displayed on eight stands that are lined up in a straight line and numbered consecutively 1 through 8 from left to right. There are three gray folders, two purple folders, two yellow folders, and one orange folder. The folders must be displayed according to the following conditions:

At least one of the purple folders must be next to a yellow folder.
The orange folder cannot be next to a yellow folder.
The three gray folders cannot be placed on three consecutive stands.
Stand 5 must hold a gray folder.
Either stand 1 or stand 8 or both must hold a yellow folder.

10. Which of the following is an acceptable ordering of colors of folders from left to right?

	Stand 1	Stand 2	Stand 3	Stand 4	Stand 5	Stand 6	Stand 7	Stand 8
(A)	Gray	Gray	Yellow	Orange	Gray	Purple	Purple	Yellow
(B)	Orange	Gray	Yellow	Gray	Purple	Purple	Gray	Yellow
(C)	Purple	Yellow	Gray	Gray	Gray	Orange	Purple	Yellow
(D)	Yellow	Gray	Purple	Yellow	Gray	Orange	Purple	Gray
(E)	Yellow	Gray	Yellow	Gray	Gray	Purple	Orange	Purple

11. If a gray folder is placed on stand 4, another gray folder could be placed on any of the following stands EXCEPT

(A) 1
(B) 3
(C) 5
(D) 7
(E) 8

12. If purple folders are on stands 1 and 2, which of the following must be true?

(A) A gray folder is on stand 3.
(B) The orange folder is on stand 4.
(C) A gray folder is on stand 4.
(D) A yellow folder is on stand 6.
(E) The orange folder is on stand 8.

13. If stand 2 holds an orange folder, which of the following must be true?

(A) Stand 1 holds a gray folder.
(B) Stand 3 holds a purple folder.
(C) Stand 6 holds a purple folder.
(D) Stand 7 holds a yellow folder.
(E) Stand 8 holds a yellow folder.

14. If stands 1 and 3 hold gray folders, any of the following could be true EXCEPT:

(A) Stand 2 holds a yellow folder.
(B) Stand 4 holds an orange folder.
(C) Stand 6 holds a purple folder.
(D) Stand 7 holds a yellow folder.
(E) Stand 7 holds an orange folder.

GO ON TO THE NEXT PAGE.

Questions 15-18

Five persons—J, K, L, M, and O—have gathered to play a game called "forest and trees." Four players play in each round, with one person sitting out. Rounds are played by two competing teams of two persons each. The players have agreed on the following rules of participation:

No two players can play as a team in two consecutive rounds of the game.

After a round is concluded, one person from the losing team in that round must sit out the next round of the game.

After a round is concluded, the person who has sat out that round and a person from the winning team in that round join to form the team that is known as "the forest" for the next round.

After a round is concluded, one person from the losing team in that round and one person from the winning team in that round join to form the team that is known as "the trees" for the next round.

No round of the game can end in a tie.

Because L and O are perceived as having the greatest individual strengths as players, L and O can never play on the same team.

15. If, in the first round of a game, J and O are the winning team and L sits out, which of the following must be a team in the second round of that game?

(A) J and L
(B) K and L
(C) K and M
(D) L and M
(E) M and O

16. If, in the first round of a game, K and L are the winning team and J sits out, which of the following could be a team in the second round of that game?

(A) J and M
(B) J and O
(C) K and L
(D) K and O
(E) M and O

17. If J and M are the winning team in the first round, each of the following could be a member of "the forest" during the second round EXCEPT

(A) J
(B) K
(C) L
(D) M
(E) O

18. If M sits out the first round, each of the following could be a team in the first round EXCEPT

(A) J and K
(B) J and L
(C) J and O
(D) K and L
(E) K and O

GO ON TO THE NEXT PAGE.

Questions 19-22

Seven persons—N, Q, R, S, T, U, and W—are all the persons present at a party. All of them join distinct conversational groups that form during the party and that consist of two, three, or four persons at a time. At any time during the party, each of the persons present is considered to be a member of exactly one of the conversational groups. During the party the following conditions are satisfied:

N can never be in the same conversational group as S.
T must be in a conversational group that includes either S or W, but T cannot be in a conversational group with both S and W.
W must be in a conversational group that consists of exactly three persons.

19. Which of the following lists three conversational groups that can exist at the same time during the party?

(A) N and S	Q, T, and W	R and U
(B) N and T	R and S	Q, U, and W
(C) N and U	R and S	Q, T, and W
(D) N and W	S and U	Q, R, and T
(E) N, U, and W	S and Q	R and T

20. If, at a certain point during the party, R, T, and W are members of three distinct conversational groups, S must at that point be in a conversational group that includes

(A) Q
(B) R
(C) T
(D) U
(E) W

21. If, at a certain point during the party, a group of three persons and a group of four persons have formed and W is in the same conversational group as U, which of the following must at that point be in the group with W and U?

(A) N
(B) Q
(C) R
(D) S
(E) T

22. If, at a certain point during the party, one of the conversational groups consists only of Q, R, and W, at that point N must be part of a group of exactly

(A) two persons, whose other member is T
(B) two persons, whose other member is U
(C) four persons, whose other members include S
(D) four persons, whose other members include T
(E) four persons, whose other members include U

GO ON TO THE NEXT PAGE.

23. Instead of relying on general tax revenue, as it now does, the government should rely more heavily on passenger fares to finance public bus and train service. In order for public transportation to be maintained without cutting service, users should pay all the operating costs even if these costs should increase. Such charges would be fair since only users benefit from public transportation.

    Which of the following is a principle on which the position above could be based?

    (A) The number of users of a public service should determine the amount of governmental financial support for the service.
    (B) The amount of public transportation provided should be dependent on the operating cost of each transportation service.
    (C) If necessary, general taxes should be raised to ensure that public transportation services are provided.
    (D) The government should provide support from general tax revenue to any transportation industry that has passenger service available to the public.
    (E) General tax revenues should not be used to finance public services that benefit a limited number of people.

24. When the manufacturer of Voltage, a major soft drink, changed its secret formula last year, the export earnings of an island in the Indian Ocean began to fall. This island's only export comprises more than half of the world's supply of vanilla beans. Analysts concluded that the original formula of Voltage contained vanilla from beans, but the new formula did not.

    Which of the following, if true, would most strengthen the conclusion drawn by the analysts?

    (A) The vanilla-bean plantings of a nearby island were beginning to produce crops.
    (B) A new process for synthesizing vanilla was under development in a laboratory in the United States.
    (C) The island's trade agreement, under which the vanilla beans were exported to the country that manufactures Voltage, had lapsed.
    (D) Imports of vanilla beans dropped in countries where Voltage is made.
    (E) There were decreases in sales of several widely sold products that were known to contain vanilla.

25. Carol is shorter than Juan, but she is taller than Ed. Sandra is shorter than Juan, and she is shorter than Ed. Wallie is taller than Sandra, but shorter than Juan.

    If the statements above are true, one can validly conclude that Bill is shorter than Carol if it is true that

    (A) Carol is equal in height to Wallie
    (B) Wallie is equal in height to Bill
    (C) Bill is taller than Sandra, but shorter than Wallie
    (D) Bill is shorter than Juan, but taller than Ed
    (E) Wallie is taller than Bill, but shorter than Ed

SECTION 4

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Although providing wild chimpanzees with food makes them less ------- and easier to study, it is also known to ------- their normal social patterns.

   (A) interesting. .reinforce (B) manageable. .upset (C) shy. .disrupt (D) poised. .inhibit (E) accessible. .retard

2. There is something ------- about the way the building of monasteries proliferated in eighteenth-century Bavaria, while in the rest of the Western world religious ardor was ------- and church building was consequently declining.

   (A) enigmatic. .coalescing
   (B) destructive. .changing
   (C) immutable. .dissipating
   (D) incongruous. .diminishing
   (E) momentous. .diversifying

3. Because they had various meanings in nineteenth-century biological thought, "mechanism" and "vitalism" ought not to be considered ------- terms; thus, I find the recent insistence that the terms had single definitions to be entirely ------- .

   (A) univocal. .erroneous
   (B) problematic. .anachronistic
   (C) intractable. .obtuse
   (D) congruent. .suspect
   (E) multifaceted. .vapid

4. Many Americans believe that individual initiative epitomized the 1890's and see the entrepreneur as the ------- of that age.

   (A) caricature (B) salvation (C) throwback (D) aberration (E) personification

5. Neither the ideas of philosophers nor the practices of ordinary people can, by themselves, ------- reality; what in fact changes reality and kindles revolution is the ------- of the two.

   (A) constitute. .divergence
   (B) affect. .aim
   (C) transform. .interplay
   (D) preserve. .conjunction
   (E) alter. .intervention

6. There has been a tendency among art historians not so much to revise as to eliminate the concept of the Renaissance—to ------- not only its uniqueness, but its very existence.

   (A) explain (B) extol (C) transmute (D) regret (E) contest

7. Employees had become so inured to the caprices of top management's personnel policies that they greeted the announcement of a company-wide dress code with-------.

   (A) astonishment (B) impassivity (C) resentment (D) apprehension (E) confusion

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. SURGEON : DEXTERITY ::
   (A) engineer : clarity
   (B) sailor : navigation
   (C) magistrate : precedent
   (D) industrialist : capital
   (E) acrobat : agility

9. PRUNE : HEDGE ::
   (A) shuck : corn
   (B) trim : hair
   (C) cut : bouquet
   (D) reap : crop
   (E) shave : mustache

10. PHOTOGRAPH : LIGHT ::
    (A) script : scene
    (B) film : negative
    (C) recording : sound
    (D) rehearsal : practice
    (E) concert : song

11. ANTIBIOTIC : INFECTION ::
    (A) hormone : modification
    (B) enzyme : digestion
    (C) narcotic : dependency
    (D) coagulant : bleeding
    (E) stimulant : relaxation

12. EULOGY : PRAISE ::
    (A) comedy : laughter
    (B) epic : contempt
    (C) tirade : awe
    (D) elegy : lament
    (E) parody : respect

13. DAMP : VIBRATION ::
    (A) drench : moisture
    (B) concentrate : extraction
    (C) boil : liquid
    (D) seal : perforation
    (E) stanch : flow

14. ABRADED : FRICTION ::
    (A) refined : distillate
    (B) anodized : metal
    (C) diluted : gas
    (D) strengthened : pressure
    (E) vaporized : heat

15. QUARRY : STONE ::
    (A) fell : timber
    (B) dredge : canal
    (C) assay : gold
    (D) bale : hay
    (E) mold : clay

16. CREDULOUS : DUPE ::
    (A) wealthy : monarch
    (B) insensitive : boor
    (C) argumentative : lawyer
    (D) spontaneous : extrovert
    (E) extravagant : miser

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

The transplantation of organs from one individual to another normally involves two major problems: (1) organ rejection is likely unless the transplantation antigens of both individuals are nearly identical, and (2) the introduction of any unmatched transplantation antigens induces the development by the recipient of donor-specific lymphocytes that will produce violent rejection of further transplantations from that donor. However, we have found that among many strains of rats these "normal" rules of transplantation are not obeyed by liver transplants. Not only are liver transplants never rejected, but they even induce a state of donor-specific unresponsiveness in which subsequent transplants of other organs, such as skin, from that donor are accepted permanently. Our hypothesis is that (1) many strains of rats simply cannot mount a sufficiently vigorous destructive immune-response (using lymphocytes) to outstrip the liver's relatively great capacity to protect itself from immune-response damage and that (2) the systemic unresponsiveness observed is due to concentration of the recipient's donor-specific lymphocytes at the site of the liver transplant.

17. The primary purpose of the passage is to treat the accepted generalizations about organ transplantation in which of the following ways?

(A) Explicate their main features
(B) Suggest an alternative to them
(C) Examine their virtues and limitations
(D) Criticize the major evidence used to support them
(E) Present findings that qualify them

18. It can be inferred from the passage that the author believes that an important difference among strains of rats is the

(A) size of their livers
(B) constitution of their skin
(C) strength of their immune-response reactions
(D) sensitivity of their antigens
(E) adaptability of their lymphocytes

19. According to the hypothesis of the author, after a successful liver transplant, the reason that rats do not reject further transplants of other organs from the same donor is that the

(A) transplantation antigens of the donor and the recipient become matched
(B) lymphocytes of the recipient are weakened by the activity of the transplanted liver
(C) subsequently transplanted organ is able to repair the damage caused by the recipient's immune-response reaction
(D) transplanted liver continues to be the primary locus for the recipient's immune-response reaction
(E) recipient is unable to manufacture the lymphocytes necessary for the immune-response reaction

20. Which of the following new findings about strains of rats that do not normally reject liver transplants, if true, would support the authors' hypothesis?

I. Stomach transplants are accepted by the recipients in all cases.
II. Increasing the strength of the recipient's immune-response reaction can induce liver-transplant rejection.
III. Organs from any other donor can be transplanted without rejection after liver transplantation.
IV. Preventing lymphocytes from being concentrated at the liver transplant produces acceptance of skin transplants.

(A) II only
(B) I and III only
(C) II and IV only
(D) I, II, and III only
(E) I, III, and IV only

GO ON TO THE NEXT PAGE.

Practically speaking, the artistic maturing of the cinema was the single-handed achievement of David W. Griffith (1875-1948). Before Griffith, photography in dramatic films consisted of little more than placing the actors before a stationary camera and showing them in full length as they would have appeared on stage. From the beginning of his career as a director, however, Griffith, because of his love of Victorian painting, employed composition. He conceived of the camera image as having a foreground and a rear ground, as well as the middle distance preferred by most directors. By 1910 he was using close-ups to reveal significant details of the scene or of the acting and extreme long shots to achieve a sense of spectacle and distance. His appreciation of the camera's possibilities produced novel dramatic effects. By splitting an event into fragments and recording each from the most suitable camera position, he could significantly vary the emphasis from camera shot to camera shot.

Griffith also achieved dramatic effects by means of creative editing. By juxtaposing images and varying the speed and rhythm of their presentation, he could control the dramatic intensity of the events as the story progressed. Despite the reluctance of his producers, who feared that the public would not be able to follow a plot that was made up of such juxtaposed images, Griffith persisted, and experimented as well with other elements of cinematic syntax that have become standard ever since. These included the flashback, permitting broad psychological and emotional exploration as well as narrative that was not chronological, and the crosscut between two parallel actions to heighten suspense and excitement. In thus exploiting fully the possibilities of editing, Griffith transposed devices of the Victorian novel to film and gave film mastery of time as well as space.

Besides developing the cinema's language, Griffith immensely broadened its range and treatment of subjects. His early output was remarkably eclectic: it included not only the standard comedies, melodramas, westerns, and thrillers, but also such novelties as adaptations from Browning and Tennyson, and treatments of social issues. As his successes mounted, his ambitions grew, and with them the whole of American cinema. When he remade *Enoch Arden* in 1911, he insisted that a subject of such importance could not be treated in the then conventional length of one reel. Griffith's introduction of the American-made multireel picture began an immense revolution. Two years later, *Judith of Bethulia,* an elaborate historicophilosophical spectacle, reached the unprecedented length of four reels, or one hour's running time. From our contemporary viewpoint, the pretensions of this film may seem a trifle ludicrous, but at the time it provoked endless debate and discussion and gave a new intellectual respectability to the cinema.

21. The primary purpose of the passage is to
    (A) discuss the importance of Griffith to the development of the cinema
    (B) describe the impact on cinema of the flashback and other editing innovations
    (C) deplore the state of American cinema before the advent of Griffith
    (D) analyze the changes in the cinema wrought by the introduction of the multireel film
    (E) document Griffith's impact on the choice of subject matter in American films

22. The author suggests that Griffith's film innovations had a direct effect on all of the following EXCEPT
    (A) film editing (B) camera work
    (C) scene composing (D) sound editing
    (E) directing

23. It can be inferred from the passage that before 1910 the normal running time of a film was
    (A) 15 minutes or less
    (B) between 15 and 30 minutes
    (C) between 30 and 45 minutes
    (D) between 45 minutes and 1 hour
    (E) 1 hour or more

24. The author asserts that Griffith introduced all of the following into American cinema EXCEPT
    (A) consideration of social issues
    (B) adaptations from Tennyson
    (C) the flashback and other editing techniques
    (D) photographic approaches inspired by Victorian painting
    (E) dramatic plots suggested by Victorian theater

GO ON TO THE NEXT PAGE.

25. The author suggests that Griffith's contributions to the cinema had which of the following results?

I. Literary works, especially Victorian novels, became popular sources for film subjects.
II. Audience appreciation of other film directors' experimentations with cinematic syntax was increased.
III. Many of the artistic limitations thought to be inherent in filmmaking were shown to be really nonexistent.

(A) II only
(B) III only
(C) I and II only
(D) II and III only
(E) I, II, and III

26. It can be inferred from the passage that Griffith would be most likely to agree with which of the following statements?

(A) The good director will attempt to explore new ideas as quickly as possible.
(B) The most important element contributing to a film's success is the ability of the actors.
(C) The camera must be considered an integral and active element in the creation of a film.
(D) The cinema should emphasize serious and sober examinations of fundamental human problems.
(E) The proper composition of scenes in a film is more important than the details of their editing.

27. The author's attitude toward photography in the cinema before Griffith can best be described as

(A) sympathetic (B) nostalgic (C) amused (D) condescending (E) hostile

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. ADHERE: (A) detach (B) cleanse (C) engulf (D) incise (E) contain

29. UNCONVENTIONALITY: (A) perceptibility (B) inscrutability (C) imperturbability (D) fidelity to custom (E) formality of discourse

30. PINCH: (A) important accomplishment (B) apt translation (C) abundant amount (D) opportune acquisition (E) unfamiliar period

31. OUTSET: (A) regression (B) series (C) exit (D) interruption (E) termination

32. RAREFY:
(A) make less humid
(B) make less opaque
(C) make more voluminous
(D) make more dense
(E) make more oily

33. EFFRONTERY: (A) charity (B) deference (C) simplicity (D) deceitfulness (E) stupidity

34. SCURVY: (A) completely centered (B) above reproach (C) imaginative (D) valiant (E) carefree

35. OBDURATE: (A) complaisant (B) similar (C) commensurate (D) uncommunicative (E) transitory

36. AVER:
(A) resign indignantly (B) condemn unjustly (C) refuse (D) deny (E) resent

37. PITH: (A) untimely action (B) insufficient attention (C) routine treatment (D) rigid formulation (E) superficial element

38. SUPINE: (A) vigilant (B) flustered (C) distorted (D) brittle (E) awkward

SECTION 5

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

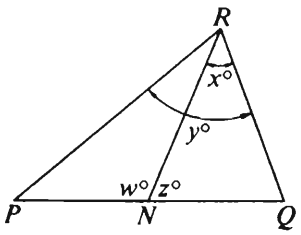
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

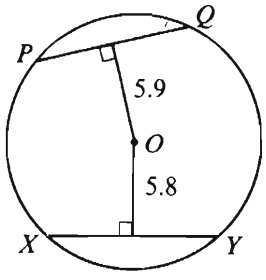
GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	$\frac{4}{5} - \frac{4}{7}$	$\frac{4}{7} - \frac{2}{5}$
2.	The average (arithmetic mean) of 87, 95, and 130	The average (arithmetic mean) of 88, 95, and 129
3.	The time that it takes Jim to drive 300 miles at a speed of 52 miles per hour	The time that it takes Lila to drive 240 miles at a speed of 40 miles per hour
4.	$(-5)^6$	$(-6)^5$

Ms. Rogers bought an electric range on the installment plan. The cash price of the range was \$400. The amount she paid was \$120 down and 12 monthly payments of \$28 each.

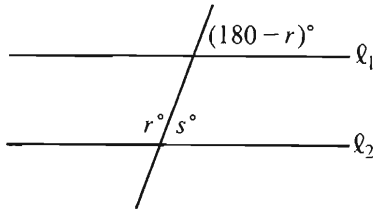
5.	The amount she paid for the electric range in excess of the cash price	\$56



Circle with center O

6.	The length of chord PQ	The length of chord XY

	Column A	Column B
	$\frac{n}{x} = 428$ and $\frac{n}{y} = 107$. $n > 0$	
7.	x	y



$\ell_1 \parallel \ell_2$

8.	s	60

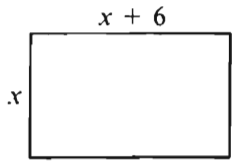
	6 is x percent of 24. y is 25 percent of 96.	
9.	x	y

	$2x + y < 3$ $x > 2$	
10.	y	0

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Column A	Column B



The perimeter of square S is equal to the perimeter of the rectangle above.

11. The length of a side of S | $x + 3$

$0 < a < b < c$

12. $\frac{b}{a}$ | $\frac{c}{b}$

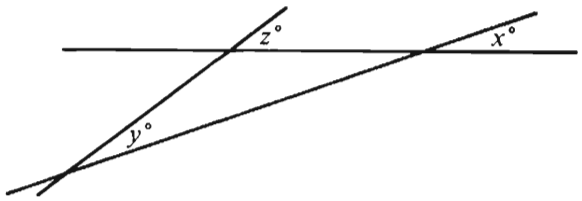
C is a circle with radius 3.

13. The ratio of the circumference of C to the diameter of C | 3

Column A	Column B

$rt > 0$

14. $\frac{3}{r} + \frac{4}{t}$ | $\frac{3t + 4r}{r + t}$



15. $z - x$ | y

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. $\frac{9^2 - 6^2}{3} =$

(A) 1
(B) $\frac{15}{9}$
(C) 5
(D) 8
(E) 15

17. What is 0.423658 rounded to the nearest thousandth?

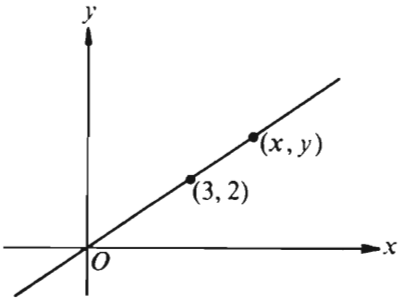
(A) 0.42
(B) 0.423
(C) 0.424
(D) 0.4236
(E) 0.4237

18. If $3(x + 2) = x - 4$, then $x =$

(A) -5
(B) -3
(C) 1
(D) 3
(E) 5

19. If $x^2 + 2xy + y^2 = 9$, then $(x + y)^4 =$

(A) 3
(B) 18
(C) 27
(D) 36
(E) 81



20. In the rectangular coordinate system above, if $x = 4.8$, then $y =$

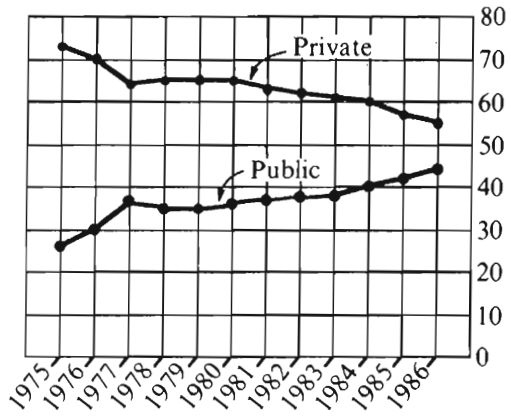
(A) 3.0
(B) 3.2
(C) 3.4
(D) 3.6
(E) 3.8

GO ON TO THE NEXT PAGE.

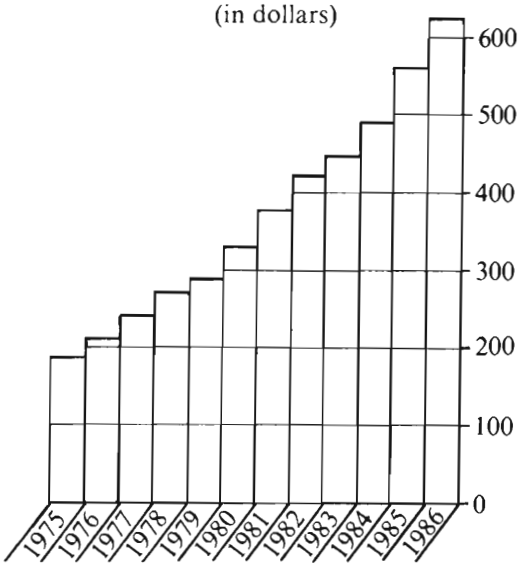
Questions 21-25 refer to the following graphs.

NATIONAL HEALTH EXPENDITURES FOR COUNTRY *X*, 1975-1986
(1 billion = 1,000,000,000)

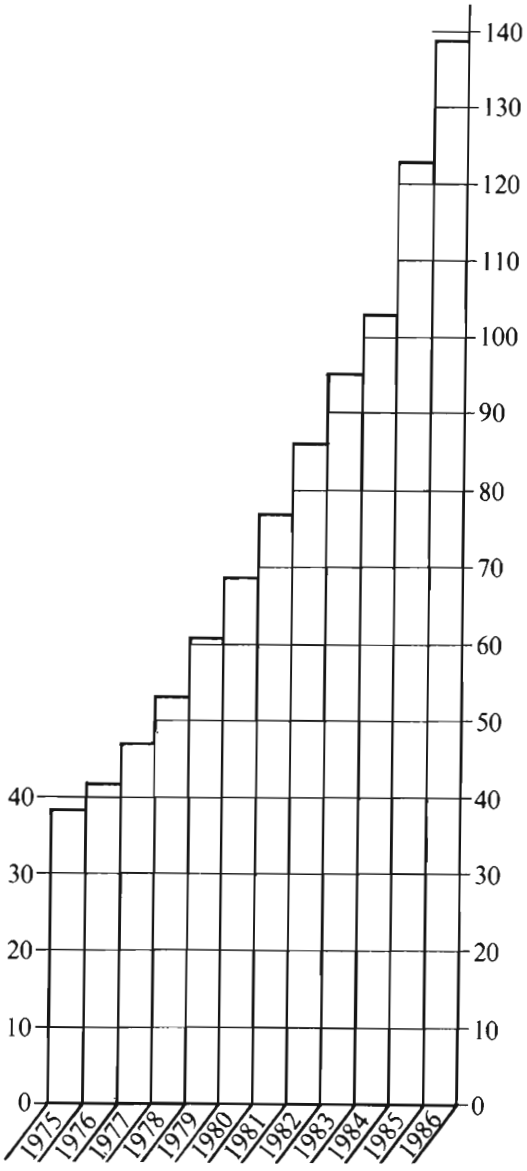
Private *vs.* Public National Health Expenditures as a Percent of Total National Health Expenditures



National Health Expenditure Per Capita (in dollars)



Total National Health Expenditures (in billions of dollars)



Note: Drawn to scale.

GO ON TO THE NEXT PAGE.

21. For how many of the years shown was the amount of private health expenditures at least double the amount of public health expenditures?

(A) None
(B) One
(C) Two
(D) Three
(E) Four

22. In which of the years from 1975 through 1986 was the national health expenditure per capita most nearly equal to half the per capita expenditure for 1984 ?

(A) 1975
(B) 1977
(C) 1979
(D) 1980
(E) 1982

23. Of the following, which is the best approximation of the percent increase in the national health expenditure per capita from 1981 to 1982 ?

(A) 35%
(B) 30%
(C) 20%
(D) 10%
(E) 5%

24. Of the following, which is closest to the amount of public national health expenditures, in billions of dollars, in 1980 ?

(A) 25
(B) 30
(C) 35
(D) 45
(E) 70

25. It can be inferred from the graphs that in 1977 the population of Country X, in millions, was closest to which of the following?

(A) 120
(B) 150
(C) 190
(D) 240
(E) 250

26. If x is the number on the number line between 5 and 15 that is twice as far from 5 as from 15, then x is

(A) $5\frac{2}{3}$

(B) 10

(C) $11\frac{2}{3}$

(D) $12\frac{1}{2}$

(E) $13\frac{1}{3}$

27. Jane has exactly 3 times as many Canadian as non-Canadian stamps in her collection. Which of the following CANNOT be the number of stamps in Jane's collection?

(A) 96
(B) 80
(C) 72
(D) 68
(E) 54

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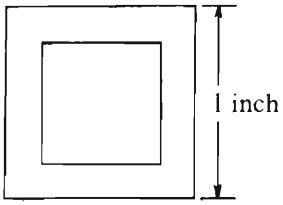

28. In the figure above, if the area of the smaller square region is $\frac{1}{2}$ the area of the larger square region, then the diagonal of the larger square is how many inches longer than the diagonal of the smaller square?

(A) $\sqrt{2} - 1$

(B) $\frac{1}{2}$

(C) $\frac{\sqrt{2}}{2}$

(D) $\frac{\sqrt{2} + 1}{2}$

(E) $\sqrt{2}$

29. A distillate flows into an empty 64-gallon drum at spout A and out of the drum at spout B. If the rate of flow through A is 2 gallons per hour, how many gallons per hour must flow out at spout B so that the drum is full in exactly 96 hours?

(A) $\frac{3}{8}$

(B) $\frac{1}{2}$

(C) $\frac{2}{3}$

(D) $\frac{4}{3}$

(E) $\frac{8}{3}$

30. A farmer has two rectangular fields. The larger field has twice the length and 4 times the width of the smaller field. If the smaller field has area K, then the area of the larger field is greater than the area of the smaller field by what amount?

(A) $2K$
(B) $6K$
(C) $7K$
(D) $8K$
(E) $12K$

SECTION 6

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-4

Three adults—Roberto, Sarah, and Vicky—will be traveling in a van with five children—Freddy, Hilary, Jonathan, Lupe, and Marta. The van has a driver's seat and one passenger seat in the front, and two benches behind the front seats, one bench behind the other. Each bench has room for exactly three people. Everyone must sit in a seat or on a bench, and seating is subject to the following restrictions:

An adult must sit on each bench.
Either Roberto or Sarah must sit in the driver's seat.
Jonathan must sit immediately beside Marta.

1. Which of the following can sit in the front passenger seat?

   (A) Jonathan
   (B) Lupe
   (C) Roberto
   (D) Sarah
   (E) Vicky

2. Which of the following groups of three can sit together on a bench?

   (A) Freddy, Jonathan, and Marta
   (B) Freddy, Jonathan, and Vicky
   (C) Freddy, Sarah, and Vicky
   (D) Hilary, Lupe, and Sarah
   (E) Lupe, Marta, and Roberto

3. If Freddy sits immediately beside Vicky, which of the following CANNOT be true?

   (A) Jonathan sits immediately beside Sarah.
   (B) Lupe sits immediately beside Vicky.
   (C) Hilary sits in the front passenger seat.
   (D) Freddy sits on the same bench as Hilary.
   (E) Hilary sits on the same bench as Roberto.

4. If Sarah sits on a bench that is behind where Jonathan is sitting, which of the following must be true?

   (A) Hilary sits in a seat or on a bench that is in front of where Marta is sitting.
   (B) Lupe sits in a seat or on a bench that is in front of where Freddy is sitting.
   (C) Freddy sits on the same bench as Hilary.
   (D) Lupe sits on the same bench as Sarah.
   (E) Marta sits on the same bench as Vicky.

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5. Private ownership of services traditionally considered to be the responsibility of the government will typically improve those services. The turnpike system in the United States of the nineteenth century demonstrates the truth of this principle; the system, which had previously been controlled by the government, became a more reliable system when taken over by private organizations.

   Which of the following describes a significant flaw in the author's argument above?

   (A) The author defends the conclusion by appealing to a person of authority.
   (B) The author distorts an opposing view in trying to show its weaknesses.
   (C) The author defends what the author perceives as a wrong action by pointing out another perceived wrong action.
   (D) The author generalizes from a sample not representative enough to establish the conclusion.
   (E) The author attributes two very different meanings to the same word.

6. A recent state survey of human resources found that the age to which secretarial school graduates are expected to live is four years in excess of the age to which other graduates of high school are expected to live. One possible conclusion is that secretarial school attendance is beneficial to one's health.

   To evaluate the conclusion above, it would be most important to know the answer to which of the following questions?

   (A) Have the average age of new high school graduates and the average age of new secretarial school graduates recently increased?
   (B) Do some secretarial school graduates have college degrees?
   (C) Given that women have a greater life expectancy than men, what are the relative proportions of men and women among high school and secretarial school graduates?
   (D) Given that women have a greater life expectancy than men, what proportion of all women attend secretarial school?
   (E) Has the proportion of high school graduates who attend secretarial school increased in recent years?

7. Some insects are able to feed on the leaves of milkweed, a toxic plant, by first cutting and draining the vein that secretes the toxin. This method of detoxification guarantees that some insects will always be able to eat milkweed, because the plant could never evolve to produce a toxin that is lethal in the trace amounts left after the vein is cut.

   The conclusion drawn in the passage above depends on which of the following assumptions?

   (A) The insects that successfully detoxify milkweed are not able to undergo the evolutionary changes necessary to allow them to detoxify other plants.
   (B) Unlike milkweed, other kinds of toxic plants would be able to overcome their vulnerabilities to predators through evolutionary changes.
   (C) The toxin-carrying veins of the milkweed plant can never evolve in such a way that insects cannot cut through.
   (D) The method of detoxification used by insect predators of milkweed would not successfully detoxify other kinds of toxic plants.
   (E) There are insects that use means other than draining the toxin in order to feed on toxic plants.

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Questions 8-12

Three desk drawers—I, II, and III—are being stocked with seven types of articles. Hand computers, ink pens, labels, markers, rulers, stationery, and tapes are to be placed in the drawers so that the articles belonging to any given type are all together in one drawer and no drawer contains more than three types of articles. The arrangement of the types of articles is subject to the following further constraints:

Hand computers and rulers must be in a drawer together.
Neither ink pens nor markers can be in the same drawer as labels.
Neither ink pens nor markers can be in the same drawer as stationery.
The stationery must be in either drawer I or drawer II.
Each type of article must be in some drawer or other.

8. Which of the following is an acceptable arrangement?

	Drawer I	Drawer II	Drawer III
(A)	Ink pens	Markers, stationery, tapes	Hand computers, labels, rulers
(B)	Ink pens, labels, stationery	Markers, tapes	Hand computers, rulers
(C)	Labels, stationery, tapes	Hand computers, ink pens, markers	Rulers
(D)	Labels, stationery, tapes	Ink pens, markers	Hand computers, rulers
(E)	Labels, tapes	Ink pens, markers	Hand computers, rulers, stationery

9. If labels are in I and stationery is in II, which of the following must be true?

(A) Hand computers are in I.
(B) Hand computers are in II.
(C) Hand computers are in III.
(D) Ink pens are in II.
(E) Ink pens are in III.

10. If labels are in II and stationery is in I, any of the following can be true EXCEPT:

(A) Hand computers are in II.
(B) Hand computers are in III.
(C) Rulers are in I.
(D) Rulers are in II.
(E) Tapes are in III.

11. If hand computers, rulers, and tapes are in I, which of the following must be true?

(A) Ink pens are in II.
(B) Labels are in I.
(C) Labels are in III.
(D) Markers are in II.
(E) Markers are in III.

12. If rulers are in II, which of the following is acceptable?

(A) Hand computers are in I and tapes are in II.
(B) Ink pens are in I and markers are in II.
(C) Ink pens are in I and markers are in III.
(D) Markers are in I and tapes are in II.
(E) Stationery is in I and labels are in II.

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Questions 13-18

A flat wilderness area has four widely separated shelters—F, G, W, and X—that are connected by exactly four straight trails—Q, R, S, and T—that are equal to each other in length and connect the shelters in the following ways:

Q connects F and W only.
R connects G and W only.
S connects F and G only.
T connects G and X only.

The shelters are at the ends of the trails.

13. Which of the following is the order in which a hiker, starting at F, using only trails and using no trail more than once, must reach the other shelters?

(A) G, W, X
(B) W, G, X
(C) W, X, G
(D) X, G, W
(E) X, W, G

14. If a hiker is at X and wants to reach F by a sequence of trails no longer than necessary, there are how many trail sequences of minimal length from which to choose?

(A) One
(B) Two
(C) Three
(D) Four
(E) Five

15. If a hiker restricts herself to the trails, any of the following is a possible sequence in which full lengths of trails are hiked EXCEPT

(A) Q, S, R, T, S
(B) R, Q, S, R, Q
(C) S, T, T, R, Q
(D) T, R, R, T, T
(E) T, S, Q, R, T

16. If a hiker walks the full length of each trail exactly once, which of the following lists all those shelters and only those shelters at which the hiker must be exactly twice?

(A) G
(B) F and G
(C) G and W
(D) G and X
(E) G, W, and X

17. If, by taking shortcuts that stray from the trails, a hiker could travel from W to X over a shorter distance than the shortest distance between W and X by trail alone, which of the following must be true?

(A) The shortest distance by trail alone from F to X is less than the shortest distance by trail alone from W to X.
(B) The shortest sequence of trails between F and X is the shortest distance between F and X.
(C) The route composed of R and T is not a straight line.
(D) The route composed of S and T is not a straight line.
(E) R meets T at a right angle.

18. If the straight-line distance between F and X is the same as the straight-line distance between W and X, which of the following can result if new straight trails are added between F and X and between W and X?

(A) The shortest distance by trail between any shelter and any other shelter is the same.
(B) The number of trails required for the shortest possible hike by trail between any shelter and any other shelter is one.
(C) The shortest distance by trail between F and X is less than the shortest distance between W and X.
(D) A hiker must travel fewer trails to travel the shortest distance between F and X than to travel the shortest distance between F and G.
(E) A hiker must travel fewer trails to travel the shortest distance between W and G than to travel the shortest distance between W and F.

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Questions 19-22

A contractor will build five houses in a certain town on a street that currently has no houses on it. The contractor will select from seven different models of houses—T, U, V, W, X, Y, and Z. The town's planning board has placed the following restrictions on the contractor:

No model can be selected for more than one house.
Either model W must be selected or model Z must be selected, but both cannot be selected.
If model Y is selected, then model V must also be selected.
If model U is selected, then model W cannot be selected.

19. If model U is one of the models selected for the street, then which of the following models must also be selected?

(A) T
(B) W
(C) X
(D) Y
(E) Z

20. If T, U, and X are three of the models selected for the street, then which of the following must be the other two models selected?

(A) V and W
(B) V and Y
(C) V and Z
(D) W and Y
(E) Y and Z

21. Which of the following is an acceptable combination of models that can be selected for the street?

(A) T, U, V, X, Y
(B) T, U, X, Y, Z
(C) T, V, X, Y, Z
(D) U, V, W, X, Y
(E) V, W, X, Y, Z

22. If model Z is one model not selected for the street, then the other model NOT selected must be which of the following?

(A) T
(B) U
(C) V
(D) W
(E) X

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23. The greater the division of labor in an economy, the greater the need for coordination. This is because increased division of labor entails a larger number of specialized producers, which results in a greater burden on managers and, potentially, in a greater number of disruptions of supply and production.

There is always more division of labor in market economies than in planned economies.

If all of the statements above are true, then which of the following must also be true?

(A) Disruptions of supply and production are more frequent in planned economies than in market economies.
(B) There are more specialized producers in planned economies than in market economies.
(C) The need for coordination in market economies is greater than in planned economies.
(D) A manager's task is easier in a market economy than in a planned economy.
(E) Division of labor functions more effectively in market economies than in planned economies.

24. Clay absorbs radiation with time, releasing it only when heated. By heating a clay sculpture and measuring the radiation it releases, experts can determine to within a century when the sculpture was last heated. The original firing of the finished sculpture might be the occasion of that most recent heating.

Experts who obtain the year A.D. 1450 as an estimate for a given sculpture using the method described above would thereby most seriously undermine any claim that the sculpture was made in

(A) A.D. 1000
(B) A.D. 1400
(C) A.D. 1450
(D) A.D. 1500
(E) A.D. 1900

25. The overall operating costs borne by many small farmers are reduced when the farmers eliminate expensive commercial chemical fertilizers and pesticides in favor of crop rotation and the twice-yearly use of manure as fertilizer. Therefore, large farmers should adopt the same measures. They will then realize even greater total savings than do the small farmers.

The argument above assumes that

(A) it is more cost-effective for small farmers to eliminate the use of commercial fertilizers and pesticides than it is for large farmers to do so
(B) a sufficient amount of manure will be available for the fields of large farmers
(C) large farmers would not realize similar cost benefits by using treated sewage sludge instead of commercial chemical fertilizers
(D) large farmers generally look to small farmers for innovative ways of increasing crop yields or reducing operating costs
(E) the smaller the farm, the more control the farmer has over operating costs

FOR GENERAL TEST 2 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 1			Section 4		
Number	Answer	P+	Number	Answer	P+
1	A	79	1	C	76
2	D	95	2	D	70
3	A	88	3	A	57
4	C	75	4	E	72
5	E	56	5	C	63
6	B	57	6	E	55
7	D	42	7	B	52
8	C	82	8	E	89
9	B	87	9	B	83
10	E	86	10	C	85
11	D	83	11	D	76
12	D	66	12	D	52
13	E	38	13	E	51
14	D	35	14	E	38
15	C	27	15	A	26
16	B	20	16	B	25
17	B	72	17	E	34
18	E	76	18	C	77
19	A	52	19	D	45
20	B	48	20	A	36
21	A	46	21	A	92
22	C	79	22	D	83
23	B	73	23	A	79
24	C	47	24	E	59
25	E	32	25	B	40
26	D	47	26	C	75
27	B	59	27	D	55
28	B	94	28	A	96
29	A	88	29	D	82
30	B	80	30	C	92
31	A	82	31	E	63
32	C	76	32	D	34
33	A	42	33	B	37
34	D	36	34	B	38
35	D	23	35	A	37
36	C	26	36	D	31
37	C	27	37	E	27
38	A	20	38	A	26

QUANTITATIVE ABILITY					
Section 2			Section 5		
Number	Answer	P+	Number	Answer	P+
1	B	80	1	A	82
2	D	82	2	C	89
3	A	78	3	B	77
4	D	80	4	A	86
5	B	81	5	C	79
6	A	76	6	B	70
7	B	72	7	B	66
8	A	62	8	D	72
9	D	59	9	A	65
10	A	56	10	B	77
11	C	36	11	C	61
12	B	38	12	D	47
13	D	34	13	A	61
14	B	27	14	D	39
15	C	22	15	C	30
16	D	94	16	E	92
17	D	79	17	C	88
18	C	78	18	A	80
19	B	74	19	E	71
20	D	72	20	B	53
21	A	82	21	C	78
22	D	75	22	B	81
23	B	69	23	D	62
24	E	52	24	A	21
25	B	40	25	C	42
26	C	61	26	C	52
27	A	52	27	E	52
28	C	48	28	A	27
29	E	40	29	D	35
30	E	39	30	C	20

ANALYTICAL ABILITY					
Section 3			Section 6		
Number	Answer	P+	Number	Answer	P+
1	D	73	1	B	90
2	B	65	2	D	79
3	E	52	3	E	36
4	C	82	4	E	58
5	C	42	5	D	79
6	E	50	6	C	75
7	A	92	7	C	66
8	A	78	8	D	77
9	B	68	9	E	71
10	D	81	10	B	50
11	B	77	11	E	61
12	C	62	12	E	52
13	E	61	13	B	76
14	E	48	14	A	35
15	A	53	15	A	51
16	D	48	16	A	58
17	B	40	17	C	43
18	A	34	18	B	38
19	C	62	19	E	61
20	C	46	20	C	45
21	A	27	21	C	58
22	B	46	22	B	60
23	E	58	23	C	68
24	D	46	24	E	44
25	E	28	25	B	45

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 2 ONLY AND THE PERCENTS BELOW*

Raw Score	Verbal Scaled Score	Verbal % Below	Quantitative Scaled Score	Quantitative % Below	Analytical Scaled Score	Analytical % Below
72-76	800	99				
71	790	99				
70	770	99				
69	760	99				
68	740	98				
67	730	97				
66	720	96				
65	710	95				
64	700	94				
63	680	93				
62	670	91				
61	660	90				
60	650	88	800	96		
59	640	87	800	96		
58	630	85	800	96		
57	610	82	790	95		
56	600	80	780	93		
55	590	78	770	92		
54	580	75	750	88		
53	570	73	740	87		
52	560	71	730	85		
51	550	69	720	83		
50	540	66	710	81	800	99
49	530	63	700	79	800	99
48	520	60	690	77	800	99
47	510	58	680	75	790	98
46	500	55	670	73	770	97
45	480	50	660	71	750	95
44	470	47	650	69	740	94
43	460	43	640	67	720	92
42	450	40	630	65	710	91
41	440	37	620	62	700	89
40	430	34	600	58	690	87

Raw Score	Verbal Scaled Score	Verbal % Below	Quantitative Scaled Score	Quantitative % Below	Analytical Scaled Score	Analytical % Below
39	430	34	590	56	670	84
38	420	31	580	53	660	81
37	410	28	570	51	650	80
36	400	25	560	49	630	75
35	390	23	550	46	620	73
34	380	20	540	44	610	70
33	370	18	520	39	600	67
32	360	15	510	37	580	62
31	350	13	500	34	570	59
30	350	13	490	32	550	53
29	340	11	480	30	540	50
28	330	9	470	28	520	45
27	320	8	460	25	510	42
26	310	7	440	21	500	38
25	310	7	430	19	480	33
24	300	5	420	17	470	30
23	290	4	410	16	450	26
22	280	3	400	14	440	23
21	280	3	380	11	420	19
20	270	2	370	10	410	17
19	260	2	360	8	390	14
18	250	1	340	6	380	12
17	250	1	330	5	360	9
16	240	1	310	3	340	7
15	230	1	300	3	330	6
14	220	1	280	2	320	5
13	210	1	270	1	300	3
12	200	1	250	1	290	3
11	200	1	240	1	280	2
10	200	1	220	1	260	1
9	200	1	210	1	250	1
8	200	1	200	1	240	1
7	200	1	200	1	230	1
6	200	1	200	1	210	1
0-5	200	1	200	1	200	1

*Percent scoring below the scaled score is based on the performance of 934,995 examinees who took the General Test between October 1, 1987, and September 30, 1990. This percent below information is used for score reports during the 1991-92 testing year.

TEST 3

SECTION 1

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-6

A personnel officer is scheduling a single interview with each of seven individuals: Fay, Gary, Julio, Mary, Nicholas, Pilar, and Teresa. Each interview is to be 30 minutes in length, and the interviews are to be scheduled back-to-back, starting at 9 a.m., according to the following conditions:

Gary's interview must be scheduled to begin at either 9 a.m. or 10:30 a.m.
Pilar's interview must be scheduled either as the next interview after Gary's interview or as the next interview after Nicholas' interview.
Nicholas' interview must be scheduled to occur sometime after Mary's interview and sometime before Fay's interview.
Julio's interview must be scheduled to begin exactly one hour after Teresa's interview is scheduled to begin.

1. Which of the following is an acceptable schedule for the seven people?

	9 a.m.	9:30 a.m.	10 a.m.	10:30 a.m.	11 a.m.	11:30 a.m.	12 noon
(A)	Gary	Nicholas	Pilar	Mary	Teresa	Fay	Julio
(B)	Gary	Pilar	Teresa	Mary	Julio	Nicholas	Fay
(C)	Mary	Gary	Pilar	Teresa	Nicholas	Julio	Fay
(D)	Mary	Teresa	Julio	Gary	Nicholas	Pilar	Fay
(E)	Teresa	Pilar	Julio	Gary	Mary	Nicholas	Fay

2. Which of the following people can be scheduled for the interview that begins at 9 a.m.?

(A) Fay
(B) Julio
(C) Mary
(D) Nicholas
(E) Pilar

3. The earliest time that Julio's interview can be scheduled to begin is

(A) 9:30 a.m.
(B) 10 a.m.
(C) 10:30 a.m.
(D) 11 a.m.
(E) 11:30 a.m.

4. If Nicholas' interview is scheduled to begin at 9:30 a.m., who must be scheduled for the interview that begins at 11 a.m.?

(A) Fay
(B) Julio
(C) Mary
(D) Pilar
(E) Teresa

5. If the interview schedule shows Teresa's interview as the next after Pilar's and Pilar's interview as the next after Nicholas', how long after Gary's interview is scheduled to begin must Julio's interview be scheduled to begin?

(A) 30 minutes
(B) 1 hour
(C) 90 minutes
(D) 2 hours
(E) 3 hours

6. If Teresa is scheduled for the interview that begins at 9 a.m., Fay's interview must be scheduled to begin at

(A) 9:30 a.m.
(B) 10:30 a.m.
(C) 11 a.m.
(D) 11:30 a.m.
(E) 12 noon

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7. Wearing either a lap seat belt or a shoulder-and-lap seat belt protects passengers from the major types of injuries incurred in head-on automobile collisions. In such collisions, however, passengers wearing lap seat belts alone frequently suffer internal injuries caused by the seat belt itself. Such injuries do not occur when shoulder-and-lap seat belts are worn.

   Which of the following conclusions about passengers involved in head-on automobile collisions is best supported by the statements above?

   (A) No type of seat belt provides passengers with adequate protection from injury.
   (B) The injuries that passengers most frequently incur are internal injuries.
   (C) Head-on automobile collisions cause more injuries to passengers than any other kind of automobile accident does.
   (D) It is safer for passengers to wear a shoulder-and-lap seat belt than to wear a lap seat belt alone.
   (E) It is safer for passengers to wear no seat belt than to wear a lap seat belt alone.

8. Nonprescription sunglasses shield the wearer's eyes from damaging ultraviolet sunlight. Squinting, however, provides protection from ultraviolet rays that is at least as good as the protection from nonprescription sunglasses. There is, therefore, no health advantage to be gained by wearing nonprescription sunglasses rather than squinting.

   Which of the following, if true, most seriously weakens support for the conclusion above?

   (A) Many opticians offer prescription sunglasses that not only screen out ultraviolet sunlight but also provide corrective vision.
   (B) Some nonprescription sunglasses provide less protection from ultraviolet sunlight than does squinting.
   (C) Squinting strains facial muscles and causes headaches and fatigue.
   (D) Many people buy sunglasses because they feel that sunglasses are fashionable.
   (E) Some people squint even when they are wearing sunglasses.

9. Studies of workplace safety in construction and manufacturing firms have found that the rate of injuries tends to rise when the firms' work loads increase. Since inexperienced workers are often hired by these firms when work loads increase, the higher rate of injuries is undoubtedly due to a higher accident rate for inexperienced workers.

   Which of the following statements, if true, would most weaken the conclusion drawn above?

   (A) Many of the inexperienced workers hired when the firms' work loads increase are hired only for temporary positions.
   (B) The studies of workplace safety were focused only on injuries that resulted in lost workdays.
   (C) There is a much higher rate of injury in construction firms than in manufacturing firms.
   (D) The accident rate for experienced workers tends to increase whenever the firms' work loads increase.
   (E) Firms that hire inexperienced workers for potentially dangerous jobs are required to provide them with training.

GO ON TO THE NEXT PAGE.

Questions 10-14

A researcher is experimenting with varying arrangements of exactly six units that are electrical conductors—G, J, K, M, P, and S—in a loop containing eight positions, each capable of containing one conductor. In each arrangement, each conductor is at one of the eight positions and two positions are empty. In devising arrangements, the researcher must obey the following restrictions:

G must be directly adjacent to J.
P must be directly adjacent to S.
M must be directly adjacent to S on one side and to an empty position on the other.

A signal can be transferred from one conductor directly to another when the two conductors are directly adjacent to each other, and only then. A signal can be transferred either way around the loop, from one conductor to another, until it reaches an empty position. A signal cannot be transferred across an empty position.

10. If a signal can be transferred, either directly or indirectly, from J to K, it must be true that a signal can be transferred, either directly or indirectly, from

(A) G to K
(B) G to M
(C) J to M
(D) J to P
(E) J to S

11. If K is directly adjacent to P, any of the following could be true EXCEPT:

(A) G is directly adjacent to K.
(B) J is directly adjacent to K.
(C) J is directly adjacent to P.
(D) G is directly adjacent to an empty position.
(E) J is directly adjacent to an empty position.

12. If P is directly adjacent to an empty position, which of the following is the greatest number of conductors, including starting and ending conductors, that can be used in the transfer of a single signal?

(A) Two
(B) Three
(C) Four
(D) Five
(E) Six

13. If there is one conductor that is directly adjacent to both of the empty positions, that conductor must be

(A) J
(B) K
(C) M
(D) P
(E) S

14. If a signal can be transferred from G to S, any of the following conductors could be directly adjacent to an empty position EXCEPT

(A) G
(B) J
(C) K
(D) M
(E) P

GO ON TO THE NEXT PAGE.

Questions 15-18

Researchers know that exactly six prehistoric iron-working sites—Q, R, S, T, V, and X—existed in the Windham area. Recently, the researchers have discovered three objects—1, 2, and 3—that they know must have been made by ironworkers in the Windham area. The researchers would like now to determine the specific site at which each object was made. The objects are different enough in composition and style to leave no doubt that each was made at a different site. In addition, the researchers have established the following:

If any of the objects was made at Q, none of them was made at T.
If any of the objects was made at R, none of them was made at S.
One of the objects was made at V.
Object 2 was not made at X.
Object 3 was made neither at S nor at X.

15. If Object 1 was made at T, Object 3 could have been made at which of the following?

(A) Q
(B) R
(C) S
(D) T
(E) X

16. Object 1, Object 2, and Object 3, respectively, could have been made at

(A) Q, S, and X
(B) R, X, and V
(C) T, V, and S
(D) V, Q, and T
(E) V, S, and Q

17. If neither Q nor T was a site at which any of the objects was made, which of the following must be true?

(A) Object 1 was made at X.
(B) Object 2 was made at S.
(C) Object 2 was made at V.
(D) Object 3 was made at R.
(E) Object 3 was made at V.

18. The researchers could determine exactly which object was made at which site if they knew that the only three sites at which objects were made were

(A) Q, R, and V
(B) Q, V, and X
(C) R, T, and V
(D) S, T, and V
(E) S, V, and X

GO ON TO THE NEXT PAGE.

Questions 19-22

Seven children—Frank, Joan, Kate, Manuel, Rose, Sam, and Theresa—are eligible to enter a spelling contest. From these seven, two teams must be formed, a red team and a green team, each team consisting of exactly three of the children. No child can be selected for more than one team. Team selection is subject to the following restrictions:

If Manuel is on the red team, Kate must be selected for the green team.
If Frank is on the red team, Rose, if selected, must be on the green team.
Rose cannot be on the same team as Sam.
Joan cannot be on the same team as Kate.

19. Which of the following can be the three members of the red team?

(A) Frank, Joan, and Kate
(B) Frank, Rose, and Theresa
(C) Joan, Kate, and Theresa
(D) Kate, Manuel, and Rose
(E) Manuel, Rose, and Theresa

20. If Manuel and Frank are both on the red team, the green team can consist of which of the following?

(A) Joan, Kate, and Rose
(B) Joan, Sam, and Theresa
(C) Kate, Rose, and Sam
(D) Kate, Rose, and Theresa
(E) Rose, Sam, and Theresa

21. If Manuel is on the red team, which of the following, if selected, must also be on the red team?

(A) Frank
(B) Joan
(C) Rose
(D) Sam
(E) Theresa

22. If Frank is selected for the red team and Theresa is not selected for either team, then which of the following CANNOT be a member of the green team?

(A) Joan
(B) Kate
(C) Manuel
(D) Rose
(E) Sam

GO ON TO THE NEXT PAGE.

Questions 23-24

The facts show that the fear of flying in airplanes is not rational. In 1986 alone, there were 46,000 fatalities in highway accidents, but from 1980 to the present an average of only 77 per year in accidents on major domestic airlines. The rate for regional airlines was only slightly higher.

23. If the evidence cited above is accurate, which of the following would be most important to know in order to evaluate the force of that evidence?

(A) Whether repeated airplane travel allays fear of flying in airplanes
(B) Whether regional and domestic airlines spend the same average amount of time per aircraft on maintenance
(C) How many people reported a fear of flying in airplanes that was strong enough to prevent them from traveling by air
(D) How many people per year have traveled by highway and how many by air since 1980
(E) How much higher the accident rate has been for regional airlines than for major domestic airlines since 1980

24. Which of the following, if true, would argue most strongly against the conclusion above?

(A) Since the inventory of spare parts kept at each airport is smaller than in earlier years, planes are often delayed at an airport while parts are flown in from another airport, and then repairs are carefully made and checked.
(B) Air fatalities from 1980 to the present have been concentrated in the last two years, with the rate rising sharply.
(C) The number of reports of near collisions in midair in 1986 was less than half those in a typical year of the 1960's, even with double the traffic of the 1960's.
(D) Many reported near collisions in midair are closer than regulations allow but are nevertheless without actual danger.
(E) Between 1980 and 1986, safety improvements in the design of automobiles steadily improved their crashworthiness.

25. In 1985 a consumer agency concluded that Xylo brand bicycles are safer to ride than are Zenon brand bicycles. The agency based the conclusion on the ratio of the number of rider injuries to the number of riding hours for each brand of bicycle from 1981 through 1984. Yet for identically designed bicycles manufactured since 1985, the number of rider injuries has been twice as great among riders of Xylos as among riders of Zenons. Therefore, the agency's conclusion would have been different for the period since 1985.

Which of the following is an assumption that, if true, supports the claim that the agency's conclusion would have been different for the period since 1985 ?

(A) For the period since 1985, the number of riding hours for Zenons totaled at least half the number of riding hours for Xylos.
(B) Of all the bicycles ridden in the period since 1985, the percentage of Xylos ridden was twice the percentage of Zenons ridden.
(C) Prior to 1985, Zenon owners were more likely than Xylo owners to report the injuries they sustained while riding their bicycles.
(D) In 1985 the agency had miscalculated the ratio for Xylos, for Zenons, or for both.
(E) Soon after the agency had issued its report, consumer demand for Xylos increased more rapidly than did consumer demand for Zenons.

SECTION 2

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

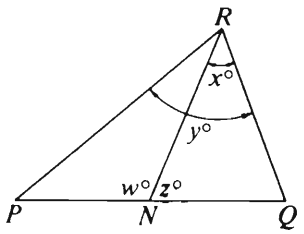
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	$10.0 + 0.9$	$9(1.0 + 0.09)$
	$r = 30$ $r + R = 59$	
2.	r^2	R^2
	$\frac{4}{9} = \frac{7 \times 4}{N \times 9}$	
3.	N	9
4.	$\frac{2}{3} + \frac{1}{2} + \frac{7}{8}$	$\frac{3}{2}$

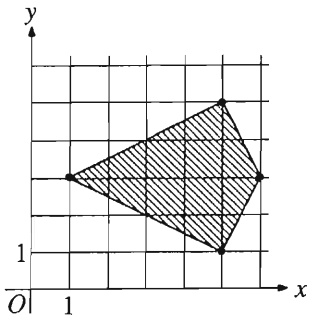


Figure 1

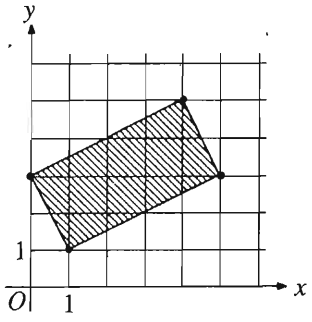
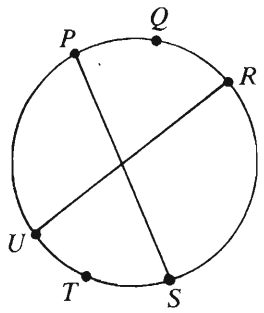


Figure 2

Note: Drawn to scale.

5.	The area of the shaded region shown in Figure 1	The area of the shaded region shown in Figure 2

	Column A	Column B
	Let the "drop" of a square be defined as the perimeter of the square minus the length of one side.	
6.	The drop of a square with area 25	20
7.	A bonus of \$450 plus a 9 percent increase in annual salary	A bonus of \$500 plus an 8.5 percent increase in annual salary



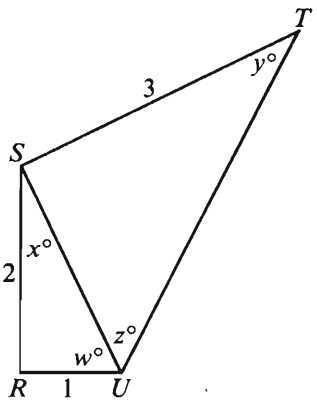
P, Q, R, S, T, and U are points on the circle as shown.

8.	The length of arc PQR	The length of arc STU
	$x > 0$	
9.	The total number of liters of water in x tanks, each containing 20 liters of water, and $2x$ tanks, each containing 35 liters of water	The total number of liters of water in x tanks, each containing 25 liters of water, and $2x$ tanks, each containing 30 liters of water

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Column A	Column B



$w + x = 90$
$y + z = 90$

10. The perimeter of $RSTU$ | 10

11. $(x - 2)^2$ | $(x + 2)^2$

$(8)(16)(32)(64) = 2^{x+y}$

12. The average (arithmetic mean) of x and y | 9

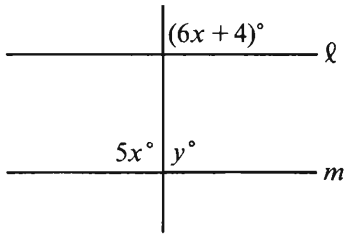
Column A	Column B

$(a + b)^2 = 49$
$ab = 12$

13. $a + b$ | 7

$x = 1 - y$

14. $x^2 + 2xy + y^2$ | $x + y$



$\ell \parallel m$

15. y | 90

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. In a certain class, if there are 35 men and 63 women, then the ratio of men to women is

(A) $\frac{7}{20}$

(B) $\frac{3}{7}$

(C) $\frac{5}{9}$

(D) $\frac{5}{7}$

(E) $\frac{7}{9}$

17. Streets L, M, and N are straight and level, and they intersect to form a triangle. If streets L and M intersect at a 40° angle and if street N is perpendicular to street M, at what acute angle do streets L and N intersect?

(A) 30°
(B) 35°
(C) 40°
(D) 45°
(E) 50°

18. $\left(1-\frac{1}{2}\right)^2\left(1-\frac{1}{3}\right)^2 =$

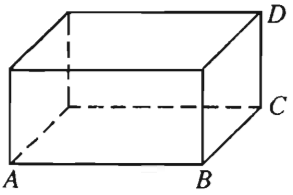
(A) $\frac{25}{36}$

(B) $\frac{1}{3}$

(C) $\frac{1}{6}$

(D) $\frac{1}{9}$

(E) $\frac{1}{18}$



19. The figure above is a rectangular solid with $AB = 10$, $BC = 10$, and $CD = 3$. What is the total surface area of the figure?

(A) 320
(B) 300
(C) 220
(D) 160
(E) 23

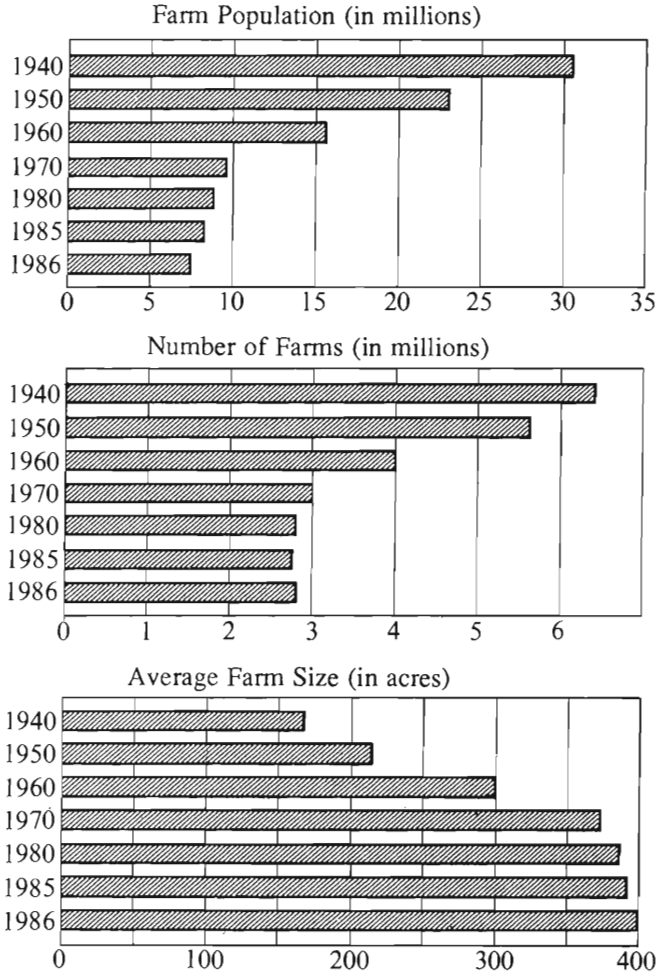
20. $6x^2 - 15x - 21 =$

(A) $3(2x + 7)(x - 1)$
(B) $3(2x - 7)(x + 1)$
(C) $3(2x - 1)(x + 7)$
(D) $-9x^2 - 21$
(E) $-9x - 21$

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graphs.

FARMING IN COUNTRY X: 1940 TO 1986



Note: All graphs drawn to scale.

21. Country X's farm population in 1986 was approximately how many million?

(A) 2.5
(B) 5.5
(C) 7.5
(D) 9.0
(E) 10.0

22. The decrease, in millions, in the number of farms from 1950 to 1970 was approximately

(A) 1.6
(B) 2.0
(C) 2.6
(D) 3.0
(E) 3.6

23. To the nearest 10 percent, the decline in farm population in Country X between 1950 and 1960 represented what percent of the 1950 farm population?

(A) 10%
(B) 30%
(C) 50%
(D) 60%
(E) 150%

GO ON TO THE NEXT PAGE.

24. In Country X, the average farm size in 1940 was approximately what fraction of the average farm size in 1986 ?

(A) $\frac{1}{4}$

(B) $\frac{2}{5}$

(C) $\frac{3}{5}$

(D) $\frac{2}{3}$

(E) $\frac{3}{4}$

25. In 1986, Country X had approximately how many million acres of farmland?

(A) 1,100
(B) 400
(C) 140
(D) 11
(E) 3

GO ON TO THE NEXT PAGE.

26. If n is the average (arithmetic mean) of the three numbers 6, 9, and k, what is the value of k in terms of n?

(A) $3n - 15$

(B) $n - 5$

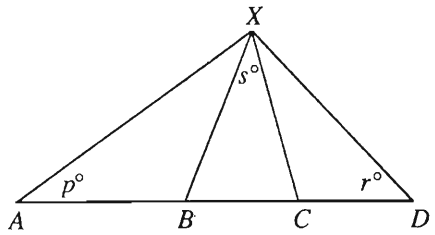
(C) $n - 15$

(D) $\frac{n - 15}{3}$

(E) $\frac{n + 15}{3}$

27. Which of the following CANNOT be expressed as the sum of the squares of two integers?

(A) 13
(B) 17
(C) 21
(D) 29
(E) 34



28. If $AB = BX$ and $XC = CD$ in the figure above, what is s in terms of p and r?

(A) $180 - 2(p + r)$

(B) $p + r - 90$

(C) $2(p + r)$

(D) $p + r$

(E) $\frac{p + r}{2}$

29. Mary has 3 dollars more than Bill has, but 5 dollars less than Jane has. If Mary has x dollars, how many dollars do Jane and Bill have altogether?

(A) $2x - 8$
(B) $2x - 5$
(C) $2x - 2$
(D) $2x + 2$
(E) $2x + 8$

30. If n is an integer divisible by 6 but not by 4, then which of the following CANNOT be an integer?

(A) $\frac{n}{2}$

(B) $\frac{n}{3}$

(C) $\frac{n}{6}$

(D) $\frac{n}{10}$

(E) $\frac{n}{12}$

SECTION 3

Time—30 minutes

37 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Although the feeding activities of whales and walruses give the seafloor of the Bering Shelf a devastated appearance, these activities seem to be actually ------- to the area, ------- its productivity.

   (A) destructive. .counterbalancing
   (B) rehabilitative. .diminishing
   (C) beneficial. .enhancing
   (D) detrimental. .redirecting
   (E) superfluous. .encumbering

2. In an age without radio or recordings, an age ------- by print, fiction gained its greatest ascendancy.

   (A) decimated
   (B) denigrated
   (C) dominated
   (D) emphasized
   (E) resurrected

3. Scientists' pristine reputation as devotees of the disinterested pursuit of truth has been ------- by recent evidence that some scientists have deliberately ------- experimental results to further their own careers.

   (A) reinforced. .published
   (B) validated. .suppressed
   (C) exterminated. .replicated
   (D) compromised. .fabricated
   (E) resuscitated. .challenged

4. Although Johnson's and Smith's initial fascination with the fortunes of those jockeying for power in the law firm ------- after a few months, the two paid sufficient attention to determine who their lunch partners should be.

   (A) revived
   (B) emerged
   (C) intensified
   (D) flagged
   (E) persisted

5. A war, even if fought for individual liberty and democratic rights, usually requires that these principles be -------, for they are ------- the regimentation and discipline necessary for military efficiency.

   (A) espoused. .contrary to
   (B) suppressed. .fulfilled through
   (C) suspended. .incompatible with
   (D) followed. .disruptive of
   (E) rejected. .inherent in

6. To test the ------- of borrowing from one field of study to enrich another, simply investigate the extent to which terms from the one may, without forcing, be ------- the other.

   (A) risk. .confused with
   (B) universality. .applied to
   (C) decorum. .illuminated by
   (D) rate. .superseded by
   (E) efficacy. .utilized by

7. The English novelist William Thackeray considered the cult of the criminal so dangerous that he criticized Dickens' *Oliver Twist* for making the characters in the thieves' kitchen so -------.

   (A) threatening
   (B) riveting
   (C) conniving
   (D) fearsome
   (E) irritating

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. ANIMAL : CAT ::
   (A) apple : pear
   (B) club : player
   (C) furniture : chair
   (D) landscape : tree
   (E) body : toe

9. CURTAIN : STAGE ::
   (A) footlight : orchestra
   (B) lid : jar
   (C) upholstery : sofa
   (D) veil : face
   (E) screen : film

10. INSOMNIA : SLEEP ::
    (A) dyslexia : read
    (B) hemophilia : bleed
    (C) hyperactivity : move
    (D) paranoia : hallucinate
    (E) malnutrition : eat

11. JEER : DERISION ::
    (A) fidget : restraint
    (B) cower : menace
    (C) slouch : vigilance
    (D) reprimand : censure
    (E) frown : adversity

12. HUMILITY : SUPPLICANT ::
    (A) espionage : felon
    (B) dilettantism : connoisseur
    (C) dogmatism : scholar
    (D) gregariousness : teammate
    (E) resistance : adversary

13. INTEREST : INVEIGLE ::
    (A) evaluate : suggest
    (B) foresee : predict
    (C) plan : scheme
    (D) interpret : examine
    (E) neglect : persecute

14. BARTER : COMMODITIES ::
    (A) arbitrate : disputes
    (B) invade : boundaries
    (C) debate : issues
    (D) correspond : letters
    (E) promote : ranks

15. PARRY : QUESTION ::
    (A) return : affection
    (B) shirk : duty
    (C) confront : dread
    (D) hurl : insult
    (E) surrender : temptation

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

(This passage is excerpted from an article that was published in 1981.)

The deep sea typically has a sparse fauna dominated by tiny worms and crustaceans, with an even sparser distribution of larger animals. However, near hydrothermal vents, areas of the ocean where warm water emerges from subterranean sources, live remarkable densities of huge clams, blind crabs, and fish.

Most deep-sea faunas rely for food on particulate matter, ultimately derived from photosynthesis, falling from above. The food supplies necessary to sustain the large vent communities, however, must be many times the ordinary fallout. The first reports describing vent faunas proposed two possible sources of nutrition: bacterial chemosynthesis, production of food by bacteria using energy derived from chemical changes, and advection, the drifting of food materials from surrounding regions. Later, evidence in support of the idea of intense local chemosynthesis was accumulated: hydrogen sulfide was found in vent water; many vent-site bacteria were found to be capable of chemosynthesis; and extremely large concentrations of bacteria were found in samples of vent water thought to be pure. This final observation seemed decisive. If such astonishing concentrations of bacteria were typical of vent outflow, then food within the vent would dwarf any contribution from advection. Hence, the widely quoted conclusion was reached that bacterial chemosynthesis provides the foundation for hydrothermal-vent food chains—an exciting prospect because no other communities on Earth are independent of photosynthesis.

There are, however, certain difficulties with this interpretation. For example, some of the large sedentary organisms associated with vents are also found at ordinary deep-sea temperatures many meters from the nearest hydrothermal sources. This suggests that bacterial chemosynthesis is not a sufficient source of nutrition for these creatures. Another difficulty is that similarly dense populations of large deep-sea animals have been found in the proximity of "smokers"—vents where water emerges at temperatures up to 350° C. No bacteria can survive such heat, and no bacteria were found there. Unless smokers are consistently located near more hospitable warm-water vents, chemosynthesis can account for only a fraction of the vent faunas. It is conceivable, however, that these large, sedentary organisms do in fact feed on bacteria that grow in warm-water vents, rise in the vent water, and then rain in peripheral areas to nourish animals living some distance from the warm-water vents.

Nonetheless, advection is a more likely alternative food source. Research has demonstrated that advective flow, which originates near the surface of the ocean where suspended particulate matter accumulates, transports some of that matter and water to the vents. Estimates suggest that for every cubic meter of vent discharge, 350 milligrams of particulate organic material would be advected into the vent area. Thus, for an average-sized vent, advection could provide more than 30 kilograms of potential food per day. In addition, it is likely that small live animals in the advected water might be killed or stunned by thermal and/or chemical shock, thereby contributing to the food supply of vents.

16. The passage provides information for answering which of the following questions?
    (A) What causes warm-water vents to form?
    (B) Do vent faunas consume more than do deep-sea faunas of similar size?
    (C) Do bacteria live in the vent water of smokers?
    (D) What role does hydrogen sulfide play in chemosynthesis?
    (E) What accounts for the locations of deep-sea smokers?

GO ON TO THE NEXT PAGE.

17. The information in the passage suggests that the majority of deep-sea faunas that live in nonvent habitats have which of the following characteristics?

(A) They do not normally feed on particles of food in the water.
(B) They are smaller than many vent faunas.
(C) They are predators.
(D) They derive nutrition from a chemosynthetic food source.
(E) They congregate around a single main food source.

18. The primary purpose of the passage is to

(A) describe a previously unknown natural phenomenon
(B) reconstruct the evolution of a natural phenomenon
(C) establish unequivocally the accuracy of a hypothesis
(D) survey explanations for a natural phenomenon and determine which is best supported by evidence
(E) entertain criticism of the author's research and provide an effective response

19. Which of the following does the author cite as a weakness in the argument that bacterial chemosynthesis provides the foundation for the food chains at deep-sea vents?

(A) Vents are colonized by some of the same animals found in other areas of the ocean floor.
(B) Vent water does not contain sufficient quantities of hydrogen sulfide.
(C) Bacteria cannot produce large quantities of food quickly enough.
(D) Large concentrations of minerals are found in vent water.
(E) Some bacteria found in the vents are incapable of chemosynthesis.

20. Which of the following is information supplied in the passage that would support the statement that the food supplies necessary to sustain vent communities must be many times that of ordinary fallout?

I. Large vent faunas move from vent to vent in search of food.
II. Vent faunas are not able to consume food produced by photosynthesis.
III. Vents are more densely populated than are other deep-sea areas.

(A) I only
(B) III only
(C) I and II only
(D) II and III only
(E) I, II, and III

21. The author refers to "smokers" (line 38) most probably in order to

(A) show how thermal shock can provide food for some vent faunas by stunning small animals
(B) prove that the habitat of most deep-sea animals is limited to warm-water vents
(C) explain how bacteria carry out chemosynthesis
(D) demonstrate how advection compensates for the lack of food sources on the seafloor
(E) present evidence that bacterial chemosynthesis may be an inadequate source of food for some vent faunas

22. Which of the following can be inferred from the passage about the particulate matter that is carried down from the surface of the ocean?

(A) It is the basis of bacterial chemosynthesis in the vents.
(B) It may provide an important source of nutrition for vent faunas.
(C) It may cause the internal temperature of the vents to change significantly.
(D) It is transported as large aggregates of particles.
(E) It contains hydrogen sulfide.

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Throughout human history there have been many stringent taboos concerning watching other people eat or eating in the presence of others. There have been attempts to explain these taboos in terms of inappropriate social relationships either between those who are involved and those who are not simultaneously involved in the satisfaction of a bodily need, or between those already satiated and those who appear to be shamelessly gorging. Undoubtedly such elements exist in the taboos, but there is an additional element with a much more fundamental importance. In prehistoric times, when food was so precious and the on-lookers so hungry, not to offer half of the little food one had was unthinkable, since every glance was a plea for life. Further, during those times, people existed in nuclear or extended family groups, and the sharing of food was quite literally supporting one's family or, by extension, preserving one's self.

23. If the argument in the passage is valid, taboos against eating in the presence of others who are not also eating would be LEAST likely in a society that

(A) had always had a plentiful supply of food
(B) emphasized the need to share worldly goods
(C) had a nomadic rather than an agricultural way of life
(D) emphasized the value of privacy
(E) discouraged overindulgence

24. The author's hypothesis concerning the origin of taboos against watching other people eat emphasizes the

(A) general palatability of food
(B) religious significance of food
(C) limited availability of food
(D) various sources of food
(E) nutritional value of food

25. According to the passage, the author believes that past attempts to explain some taboos concerning eating are

(A) unimaginative
(B) implausible
(C) inelegant
(D) incomplete
(E) unclear

26. In developing the main idea of the passage, the author does which of the following?

(A) Downplays earlier attempts to explain the origins of a social prohibition.
(B) Adapts a scientific theory and applies it to a spiritual relationship.
(C) Simplifies a complex biological phenomenon by explaining it in terms of social needs.
(D) Reorganizes a system designed to guide personal behavior.
(E) Codifies earlier, unsystematized conjectures about family life.

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

27. CONSOLIDATION: (A) instigation (B) fragmentation (C) restriction (D) opposition (E) provocation

28. SECURE: (A) infest (B) unearth (C) impart (D) implant (E) unfasten

29. FRACAS: (A) rapture (B) relic (C) novel predicament (D) peaceful situation (E) just reward

30. GRATE: (A) soothe (B) gather (C) acknowledge (D) forgive (E) improve

31. HYPERBOLE: (A) equivocation (B) criticism (C) understatement (D) pessimism (E) skepticism

32. INERRANCY: (A) productivity (B) generosity (C) volubility (D) fallibility (E) plausibility

33. STEEP: (A) relax (B) repulse (C) plummet (D) clarify (E) parch

34. RECUMBENT: (A) well fortified (B) standing up (C) lacking flexibility (D) constricted (E) alarmed

35. NATTY: (A) sloppy (B) quiet (C) loose (D) common (E) difficult

36. EXIGENT: (A) unprepossessing (B) inquisitive (C) devoted (D) absurd (E) deferrable

37. PLATITUDE:
(A) concise formulation
(B) original observation
(C) unsubstantiated claim
(D) relevant concern
(E) insincere remark

SECTION 4

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-7

The manager of a commercial printing firm is scheduling exactly six jobs—P, Q, S, T, W, and X—for a particular week, Monday through Saturday. Each job can be completed in one full day, and exactly one job will be scheduled for each day. The jobs must be scheduled according to the following conditions:

P must be printed sometime before S is printed.
T must be printed on the day immediately before or the day immediately after the day on which X is printed.
W must be printed on Thursday.

1. Which of the following is an acceptable schedule of jobs for the week?

	Mon.	Tues.	Wed.	Thurs.	Fri.	Sat.
(A)	P	Q	T	W	X	S
(B)	P	W	S	X	T	Q
(C)	Q	X	T	W	S	P
(D)	T	X	P	W	Q	S
(E)	X	P	T	W	S	Q

2. Any of the following could be printed on Saturday EXCEPT

(A) P
(B) Q
(C) S
(D) T
(E) X

3. If Q is printed on Wednesday, which of the following could be true?

(A) P is printed on Tuesday.
(B) S is printed on Monday.
(C) S is printed on Friday.
(D) T is printed on Monday.
(E) X is printed on Thursday.

4. If X is printed on Monday, which of the following must be true?

(A) P is printed sometime before Q.
(B) P is printed sometime before W.
(C) Q is printed sometime before S.
(D) W is printed sometime before Q.
(E) W is printed sometime before S.

5. If P is printed on Tuesday, which of the following must be true?

(A) Q is printed on Monday.
(B) S is printed on Thursday.
(C) S is printed on Saturday.
(D) T is printed on Wednesday.
(E) X is printed on Saturday.

6. If T is printed on Tuesday, any of the following could be true EXCEPT:

(A) P is printed on Monday.
(B) Q is printed on Saturday.
(C) S is printed on Wednesday.
(D) S is printed on Friday.
(E) X is printed on Wednesday.

7. If Q is printed on Friday, which of the following must be true?

(A) P is printed on Monday.
(B) P is printed on Wednesday.
(C) S is printed on Saturday.
(D) T is printed on Monday.
(E) X is printed on Tuesday.

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8. Although the human population around the forestland in Middlesex County has increased, the amount of forestland has not been reduced. Therefore, the decrease in the county's songbird population cannot be attributed to the growth in the county's human population.

   Which of the following, if true, most seriously weakens the conclusion above?

   (A) As the human population of Middlesex County has grown, there has been an increase in the number of shopping malls built.
   (B) The presence of more garbage cans resulting from the increase in the county's human population ensures the survival of more raccoons, which prey on songbird eggs whenever available.
   (C) There has recently been a decrease in the amount of rain-forest land in Central and South America, where songbirds spend the winter months.
   (D) Although several species of songbirds are disappearing from Middlesex County, these species are far from being endangered.
   (E) The disappearance of songbirds, which eat insects, often results in increased destruction of trees by insects.

9. In October 1987 the United States stock market suffered a major drop in prices. During the weeks after the drop, the volume of stocks traded also dropped sharply to well below what had been the weekly average for the preceding year. However, the volume for the entire year was not appreciably different from the preceding year's volume.

   Which of the following, if true, resolves the apparent contradiction presented in the passage above?

   (A) Foreign investors usually buy United States stocks only when prices are low.
   (B) The number of stock buyers in 1987 remained about the same as it had been the preceding year.
   (C) For some portion of 1987, the volume of stocks traded was higher than the average for that year.
   (D) The greater the volume of stocks traded in a given year, the lower the average price per share on the United States stock market for that year.
   (E) The volume of stocks traded rises and falls in predictable cycles.

10. In a recent year California produced an orange crop equal to only seventy-six percent of Florida's orange crop. However, when citrus crops as a group, including oranges, were compared, the California crop was twenty-three percent greater than Florida's crop for the same year.

    If the information above is true, which of the following can properly be concluded about the Florida and California citrus crops in the year mentioned?

    (A) Florida's climate was suited only to growing oranges.
    (B) Florida produced larger oranges than California did.
    (C) California produced more oranges than it did non-orange citrus.
    (D) California's proportion of non-orange citrus crops was higher than Florida's.
    (E) California had more acreage that could be devoted to agriculture than did Florida.

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Questions 11-15

A conference organizer must select exactly three discussants to respond to a paper to be presented by an invited speaker. The three discussants will be selected from seven volunteers, of whom four—Ito, Kemble, López, and Miller—are known to be friendly to the speaker's theoretical point of view. The other three—Shapiro, Thompson, and Ullman—are known to be hostile to the speaker's theoretical point of view. In selecting the three discussants, the conference organizer must observe the following restrictions:

At least one friendly discussant and at least one hostile discussant must be among those selected.
If Ito is selected, Thompson cannot be selected.
If either López or Miller is selected, the other must also be selected.
If either Kemble or Ullman is selected, the other must also be selected.

11. Which of the following could be the group of discussants selected?

(A) Ito, López, and Miller
(B) Ito, Shapiro, and Thompson
(C) Kemble, Shapiro, and Ullman
(D) López, Shapiro, and Thompson
(E) Miller, Thompson, and Ullman

12. If Ito is selected as a discussant, which of the following must also be among those selected?

(A) López
(B) Miller
(C) Shapiro
(D) Thompson
(E) Ullman

13. Which of the following is a pair of volunteers that can be selected together as discussants?

(A) Ito and López
(B) Ito and Shapiro
(C) Kemble and López
(D) Miller and Shapiro
(E) Miller and Ullman

14. The members of the group of discussants would be completely determined if which of the following additional restrictions had to be observed as well?

(A) Friendly discussants must be in the majority.
(B) Hostile discussants must be in the majority.
(C) Neither Ito nor Thompson can be selected.
(D) Neither Kemble nor Shapiro can be selected.
(E) Neither López nor Thompson can be selected.

15. The group of discussants selected must include either

(A) Ito or Shapiro
(B) Kemble or Shapiro
(C) Kemble or Thompson
(D) López or Miller
(E) López or Ullman

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Questions 16-18

At a large airport, the airport loop bus travels to Terminal A, Terminal B, and Long-Term Parking. The bus makes four stops at Terminal A—these are called A1, A2, A3, and A4, in that order. Next, the bus makes three stops at Terminal B—B1, B2, and B3, in that order. The bus then stops at Long-Term Parking. From Long-Term Parking the bus proceeds to A1 and repeats the entire loop.

At the same airport, an express monorail travels back and forth between A3 and Long-Term Parking only, and another express monorail travels back and forth between B2 and Long-Term Parking only.

The loop bus and two monorails are the only ways to move among the stops above. All transportation at the airport operates continuously and is available at no charge to all who wish to travel.

16. To travel from Long-Term Parking to A4 making the fewest possible intermediate stops, a person must take the

(A) loop bus, but neither monorail
(B) monorail to Terminal A, but neither the loop bus nor the other monorail
(C) loop bus first and the monorail to Terminal A second
(D) monorail to Terminal A first and the loop bus second
(E) monorail to Terminal B first and the loop bus second

17. Which of the following could be the second intermediate stop for a person traveling from A2 to B3 ?

(A) A3
(B) B1
(C) B2
(D) B3
(E) Long-Term Parking

18. If all of the following trips are to be made with the fewest possible intermediate stops, the trip that requires use of both a monorail and the loop bus is

(A) A2 to A3
(B) A4 to B1
(C) Long-Term Parking to A2
(D) Long-Term Parking to A4
(E) Long-Term Parking to B2

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Questions 19-22

A veterinarian is doing an informal study of the growth of exactly seven poodles—Fido, Monet, Pal, Quixote, Rover, Spot, and Tâche—all six-month-old puppies from the same litter. The veterinarian's assistant collected the following comparative data concerning the poodles' heights:

Rover is taller than Tâche.
Quixote is taller than Spot.
Fido is taller than Tâche.
Pal is taller than Monet, but Tâche is taller than Pal.
None of the seven poodles is exactly the same height as any other poodle from the litter.

19. Which of the following could be the correct ordering of the poodles from tallest to shortest?

(A) Fido, Rover, Tâche, Monet, Quixote, Pal, Spot
(B) Quixote, Spot, Fido, Tâche, Pal, Rover, Monet
(C) Rover, Fido, Tâche, Pal, Quixote, Monet, Spot
(D) Rover, Tâche, Quixote, Pal, Spot, Fido, Monet
(E) Spot, Rover, Fido, Tâche, Pal, Quixote, Monet

20. Which of the following must be true?

(A) Fido is taller than Pal.
(B) Fido is taller than Rover.
(C) Quixote is taller than Pal.
(D) Spot is taller than Monet.
(E) Tâche is taller than Spot.

21. If Spot is taller than Tâche, which of the following must be true?

(A) Quixote is taller than Fido.
(B) Quixote is taller than Pal.
(C) Quixote is taller than Rover.
(D) Rover is taller than Fido.
(E) Tâche is taller than Quixote.

22. If Tâche is taller than Quixote, any of the following can be true EXCEPT:

(A) Monet is taller than Quixote.
(B) Quixote is taller than Pal.
(C) Quixote is taller than Rover.
(D) Spot is taller than Monet.
(E) Spot is taller than Pal.

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23. Researchers studying sets of identical twins who were raised apart in dissimilar environments found that in each case the twins were similar in character, medical history, and life experiences. The researchers saw these results as confirmation of the hypothesis that heredity is more important than environment in determining human personalities and life histories.

    The existence of which of the following would tend to weaken the support for the hypothesis above most seriously?

    (A) A set of identical twins raised together who are shown by appropriate tests to have very similar value systems
    (B) A pair of identical twins raised apart who differ markedly with respect to aggressiveness and other personality traits
    (C) A younger brother and older sister raised together who have similar personalities and life experiences
    (D) A mother and daughter who have the same profession even though they have very different temperaments
    (E) A pair of twins raised together who have similar personality traits but different value systems

24. Because the process of freezing food consumes energy, many people keep their electric freezers half-empty, using them only to store commercially frozen foods. Yet freezers that are half-empty often consume more energy than they would if they were kept fully stocked.

    Which of the following, if true, contributes most to an explanation of the apparent discrepancy described above?

    (A) A given volume of air in a freezer requires much more energy to be maintained at a temperature below freezing than does an identical volume of frozen food.
    (B) The more often a freezer's door is opened, the more energy is required to maintain that freezer's normal temperature.
    (C) When unfrozen foods are placed in a freezer, the average temperature of a given volume of air inside that freezer rises temporarily.
    (D) A person who normally maintains a half-empty freezer can cut energy costs considerably by using a freezer that is 50 percent smaller.
    (E) An electric freezer can operate efficiently only if chilled air is free to circulate within the freezing compartment.

25. People often do not make decisions by using the basic economic principle of rationally weighing all possibilities and then making the choice that can be expected to maximize benefits and minimize harm. Routinely, people process information in ways that are irrational in this sense.

    Any of the following, if true, would provide evidence in support of the assertions above EXCEPT:

    (A) People tend to act on new information, independent of its perceived relative merit, rather than on information they already have.
    (B) People prefer a major risk taken voluntarily to a minor one that has been forced on them, even if they know that the voluntarily taken risk is statistically more dangerous.
    (C) People tend to take up potentially damaging habits even though they have clear evidence that their own peers as well as experts disapprove of such behavior.
    (D) People avoid situations in which they could become involved in accidents involving large numbers of people more than they do situations where single-victim accidents are possible, even though they realize that an accident is more likely in the latter situations than in the former.
    (E) People usually give more weight to a physician's opinion about the best treatment for a disease than they do to the opinion of a neighbor if they realize that the neighbor is not an expert in disease treatment.

SECTION 5
Time—30 minutes
38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. The discovery that, friction excluded, all bodies fall at the same rate is so simple to state and to grasp that there is a tendency to ------- its significance.

   (A) underrate
   (B) control
   (C) reassess
   (D) praise
   (E) eliminate

2. Their mutual teasing seemed -------, but in fact it ------- a long-standing hostility.

   (A) aimless. .produced
   (B) friendly. .masked
   (C) playful. .contravened
   (D) bitter. .revealed
   (E) clever. .averted

3. Noting that few employees showed any ------- for complying with the corporation's new safety regulations, Peterson was forced to conclude that acceptance of the regulations would be -------, at best.

   (A) aptitude. .unavoidable
   (B) regard. .indeterminate
   (C) respect. .negotiable
   (D) patience. .imminent
   (E) enthusiasm. .grudging

4. It has been argued that politics as -------, whatever its transcendental claims, has always been the systematic organization of common hatreds.

   (A) a theory
   (B) an ideal
   (C) a practice
   (D) a contest
   (E) an enigma

5. In many science fiction films, the opposition of good and evil is portrayed as a ------- between technology, which is -------, and the errant will of a depraved intellectual.

   (A) fusion. .useful
   (B) struggle. .dehumanizing
   (C) parallel. .unfettered
   (D) conflict. .beneficent
   (E) similarity. .malevolent

6. Although scientists claim that the seemingly ------- language of their reports is more precise than the figurative language of fiction, the language of science, like all language, is inherently -------.

   (A) ornamental. .subtle
   (B) unidimensional. .unintelligible
   (C) symbolic. .complex
   (D) literal. .allusive
   (E) subjective. .metaphorical

7. In recent decades the idea that Cézanne influenced Cubism has been caught in the ------- between art historians who credit Braque with its invention and those who ------- Picasso.

   (A) crossfire. .tout
   (B) interplay. .advocate
   (C) paradox. .prefer
   (D) deliberation. .attribute
   (E) tussle. .substitute

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. DISGUISE : IDENTIFICATION ::
   (A) equivocation : ambiguity
   (B) facade : decoration
   (C) forgery : wealth
   (D) camouflage : detection
   (E) manipulation : advantage

9. BIRD : FEATHERS ::
   (A) mammal : spine
   (B) hand : fingers
   (C) branch : fruit
   (D) limb : fur
   (E) fish : scales

10. ELBOW : JOINT ::
   (A) cell : tissue
   (B) corpuscle : blood
   (C) muscle : bone
   (D) skull : skeleton
   (E) heart : organ

11. ENDOW : INCOME ::
   (A) emit : signals
   (B) endorse : approval
   (C) enchant : magic
   (D) embark : voyage
   (E) endure : hardships

12. BOMBAST : POMPOUS ::
   (A) prose : economical
   (B) circumlocution : patient
   (C) prattle : succinct
   (D) verbiage : mundane
   (E) tirade : critical

13. CARET : INSERTION ::
   (A) pound : heaviness
   (B) tongs : extraction
   (C) comma : pause
   (D) quotation : agreement
   (E) clip : attachment

14. OPAQUE : LIGHT ::
   (A) inaudible : sound
   (B) unbreakable : plastic
   (C) reflective : mirror
   (D) nonporous : liquid
   (E) viscous : fluid

15. FEARLESS : DAUNT ::
   (A) perplexed : enlighten
   (B) nondescript : neglect
   (C) avaricious : motivate
   (D) impassive : perturb
   (E) tranquil : pacify

16. QUERULOUS : COMPLAIN ::
   (A) humble : fawn
   (B) prodigal : spend
   (C) treacherous : trust
   (D) laconic : talk
   (E) culpable : blame

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

(This passage is from a book published in 1975.)

That Louise Nevelson is believed by many critics to be the greatest twentieth-century sculptor is all the more remarkable because the greatest resistance to women artists has been, until recently, in the field of sculpture. Since Neolithic times, sculpture has been considered the prerogative of men, partly, perhaps, for purely physical reasons: it was erroneously assumed that women were not suited for the hard manual labor required in sculpting stone, carving wood, or working in metal. It has been only during the twentieth century that women sculptors have been recognized as major artists, and it has been in the United States, especially since the decades of the fifties and sixties, that women sculptors have shown the greatest originality and creative power. Their rise to prominence parallels the development of sculpture itself in the United States: while there had been a few talented sculptors in the United States before the 1940's, it was only after 1945—when New York was rapidly becoming the art capital of the world—that major sculpture was produced in the United States. Some of the best was the work of women.

By far the most outstanding of these women is Louise Nevelson, who in the eyes of many critics is the most original female artist alive today. One famous and influential critic, Hilton Kramer, said of her work, "For myself, I think Ms. Nevelson succeeds where the painters often fail."

Her works have been compared to the Cubist constructions of Picasso, the Surrealistic objects of Miro, and the Merzbau of Schwitters. Nevelson would be the first to admit that she has been influenced by all of these, as well as by African sculpture, and by Native American and pre-Columbian art, but she has absorbed all these influences and still created a distinctive art that expresses the urban landscape and the aesthetic sensibility of the twentieth century. Nevelson says, "I have always wanted to show the world that art is everywhere, except that it has to pass through a creative mind."

Using mostly discarded wooden objects like packing crates, broken pieces of furniture, and abandoned architectural ornaments, all of which she has hoarded for years, she assembles architectural constructions of great beauty and power. Creating very freely with no sketches, she glues and nails objects together, paints them black, or more rarely white or gold, and places them in boxes. These assemblages, walls, even entire environments create a mysterious, almost awe-inspiring atmosphere. Although she has denied any symbolic or religious intent in her works, their three-dimensional grandeur and even their titles, such as *Sky Cathedral* and *Night Cathedral*, suggest such connotations. In some ways, her most ambitious works are closer to architecture than to traditional sculpture, but then neither Louise Nevelson nor her art fits into any neat category.

17. The passage focuses primarily on which of the following?

(A) A general tendency in twentieth-century art
(B) The work of a particular artist
(C) The artistic influences on women sculptors
(D) Critical responses to twentieth-century sculpture
(E) Materials used by twentieth-century sculptors

18. Which of the following statements is supported by information given in the passage?

(A) Since 1945 women sculptors in the United States have produced more sculpture than have men sculptors.
(B) Since 1950 sculpture produced in the United States has been the most original and creative sculpture produced anywhere.
(C) From 1900 to 1950 women sculptors in Europe enjoyed more recognition for their work than did women sculptors in the United States.
(D) Prior to 1945 there were many women sculptors whose work was ignored by critics.
(E) Prior to 1945 there was little major sculpture produced by men or women sculptors working in the United States.

19. The author quotes Hilton Kramer in lines 25-27 most probably in order to illustrate which of the following?

(A) The realism of Nevelson's work
(B) The unique qualities of Nevelson's style
(C) The extent of critical approval of Nevelson's work
(D) A distinction between sculpture and painting
(E) A reason for the prominence of women sculptors since the 1950's

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20. Which of the following is one way in which Nevelson's art illustrates her theory as it is expressed in lines 36-38 ?

(A) She sculpts in wood rather than in metal or stone.
(B) She paints her sculptures and frames them in boxes.
(C) She makes no preliminary sketches but rather allows the sculpture to develop as she works.
(D) She puts together pieces of ordinary objects once used for different purposes to make her sculptures.
(E) She does not deliberately attempt to convey symbolic or religious meanings through her sculpture.

21. It can be inferred from the passage that the author believes which of the following about Nevelson's sculptures?

(A) They suggest religious and symbolic meanings.
(B) They do not have qualities characteristic of sculpture.
(C) They are mysterious and awe-inspiring, but not beautiful.
(D) They are uniquely American in style and sensibility.
(E) They show the influence of twentieth-century architecture.

22. The author regards Nevelson's stature in the art world as "remarkable" (line 3) in part because of which of the following?

(A) Her work is currently overrated.
(B) Women sculptors have found it especially difficult to be accepted and recognized as major artists.
(C) Nevelson's sculptures are difficult to understand.
(D) Many art critics have favored painting over sculpture in writing about developments in the art world.
(E) Few of the artists prominent in the twentieth century have been sculptors.

23. Which of the following statements about Nevelson's sculptures can be inferred from the passage?

(A) They are meant for display outdoors.
(B) They are often painted in several colors.
(C) They are sometimes very large.
(D) They are hand carved by Nevelson.
(E) They are built around a central wooden object.

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Volcanic rock that forms as fluid lava chills rapidly is called pillow lava. This rapid chilling occurs when lava erupts directly into water (or beneath ice) or when it flows across a shoreline and into a body of water. While the term "pillow lava" suggests a definite shape, in fact geologists disagree. Some geologists argue that pillow lava is characterized by discrete, ellipsoidal masses. Others describe pillow lava as a tangled mass of cylindrical, interconnected flow lobes. Much of this controversy probably results from unwarranted extrapolations of the original configuration of pillow flows from two-dimensional cross sections of eroded pillows in land outcroppings. Virtually any cross section cut through a tangled mass of interconnected flow lobes would give the appearance of a pile of discrete ellipsoidal masses. Adequate three-dimensional images of intact pillows are essential for defining the true geometry of pillowed flows and thus ascertaining their mode of origin. Indeed, the term "pillow," itself suggestive of discrete masses, is probably a misnomer.

Line (5) (10) (15)

24. Which of the following is a fact presented in the passage?
    (A) The shape of the connections between the separate, sacklike masses in pillow lava is unknown.
    (B) More accurate cross sections of pillow lava would reveal the mode of origin.
    (C) Water or ice is necessary for the formation of pillow lava.
    (D) No three-dimensional examples of intact pillows currently exist.
    (E) The origin of pillow lava is not yet known.

25. In the passage, the author is primarily interested in
    (A) analyzing the source of a scientific controversy
    (B) criticizing some geologists' methodology
    (C) pointing out the flaws in a geological study
    (D) proposing a new theory to explain existing scientific evidence
    (E) describing a physical phenomenon

26. The author of the passage would most probably agree that the geologists mentioned in line 6 ("Some geologists") have made which of the following errors in reasoning?
    I. Generalized unjustifiably from available evidence.
    II. Deliberately ignored existing counterevidence.
    III. Repeatedly failed to take new evidence into account.
    (A) I only (B) II only (C) III only
    (D) I and II only (E) II and III only

27. The author implies that the "controversy" (line 9) might be resolved if
    (A) geologists did not persist in using the term "pillow"
    (B) geologists did not rely on potentially misleading information
    (C) geologists were more willing to confer directly with one another
    (D) two-dimensional cross sections of eroded pillows were available
    (E) existing pillows in land outcroppings were not so badly eroded

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. PEER:
(A) a complicated structure
(B) an insignificant explanation
(C) a subordinate person
(D) an inept musician
(E) an unreliable worker

29. SYNCHRONOUS:
(A) unusual in appearance
(B) of a distinct origin
(C) occurring at different times
(D) monotonous
(E) shapeless

30. ALIENATE: (A) reunite (B) influence
(C) relieve (D) match (E) revitalize

31. PREDESTINE: (A) jumble (B) doubt
(C) leave to chance (D) arrange incorrectly
(E) defy authority

32. AERATE: (A) generate (B) create (C) elevate
(D) combine water with (E) remove air from

33. FALLOW: (A) abundant (B) valuable
(C) necessary (D) in use (E) in demand

34. CORROBORATE: (A) tire (B) rival
(C) deny (D) antagonize (E) disengage

35. PERUSE: (A) glide along (B) argue against
(C) strive for (D) pick up (E) glance at

36. SEEMLY: (A) indecorous (B) inapparent
(C) disconnected (D) disingenuous
(E) deleterious

37. TENUOUS: (A) substantial (B) obdurate
(C) permanent (D) ubiquitous (E) intelligible

38. GRATUITOUS: (A) thankless (B) warranted
(C) trying (D) discreet (E) spurious

SECTION 6

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

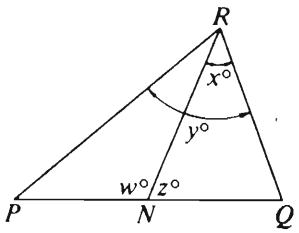
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

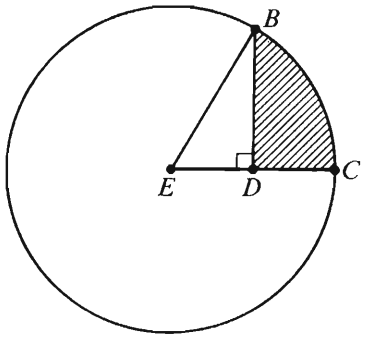
GO ON TO THE NEXT PAGE

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	$\frac{3}{7}$	$\frac{9}{49}$

$2x + 3y = 3x + 2y$

2.	x	y



The circle with center E has radius r.

$ED = \frac{r}{2}$

3.	The area of $\triangle EBD$	The area of the shaded region

$xy \neq 0$

4.	$\frac{x - y}{x}$	$\frac{x - y}{y}$
5.	$\sqrt{21} + \sqrt{15}$	$\sqrt{21 + 15}$

$x > y > 0$

6.	$y - x$	0
7.	The area of a circular region with circumference 16π	The circumference of a circular region with area 16π

$3 < x < 4$

$y = 5$

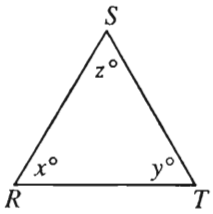
8.	$\frac{x}{y}$	0.7

A discount of 40 percent of the original selling price of an item reduces the price to \$72.

9.	The original selling price of the item	\$120

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
		
	$x = z$	
10.	RT	RS

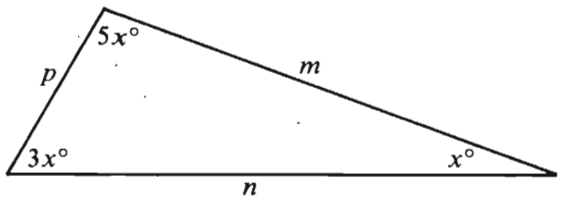
Item X costs twice as much as item Z, and item Y costs \$3 more than half the cost of item Z.

11.	The cost of item X	The cost of item Y

For all integers x and y, let $x \bigstar y$ be defined as follows.

$$x \bigstar y = -|x + y|$$

12.	$3 \bigstar (-4)$	$3 - 4$
13.	0.4	$\sqrt{0.4}$

	Column A	Column B
	A rectangular textbook page measures $8\frac{1}{2}$ inches by 11 inches. The page is partitioned into rectangular spaces each $\frac{1}{12}$ inch by $\frac{1}{8}$ inch.	
14.	The number of such spaces on the textbook page	$17 \times 11 \times 48$
		
15.	n^2	$p^2 + m^2$

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. If $2x + y = 8$ and $3x = 6$, then $y =$

(A) 2
(B) 4
(C) 6
(D) 8
(E) 12

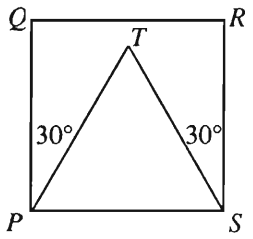
	Number of Lawn Mowers
Monday	752
Tuesday	747
Wednesday	755
Thursday	754
Friday	

17. The table above shows the number of lawn mowers produced by Company L each workday last week except Friday. If Company L produced an average (arithmetic mean) of 750 lawn mowers per day for the workweek, how many lawn mowers did it produce on Friday?

(A) 736
(B) 739
(C) 742
(D) 750
(E) 758

18. Mario bought equal numbers of 2-cent and 3-cent stamps. If the total cost of the stamps was \$1.00, what was the total number of stamps bought?

(A) 25
(B) 34
(C) 40
(D) 46
(E) 50



19. In square $PQRS$ above, $\triangle PTS$ has a perimeter of 30. What is the area of square $PQRS$?

(A) 30
(B) 50
(C) 60
(D) 75
(E) 100

20. If $r > 0$, then $\sqrt{0.25r^6} =$

(A) $0.05r^3$
(B) $0.05r^4$
(C) $0.05r^5$
(D) $0.5r^2$
(E) $0.5r^3$

GO ON TO THE NEXT PAGE.

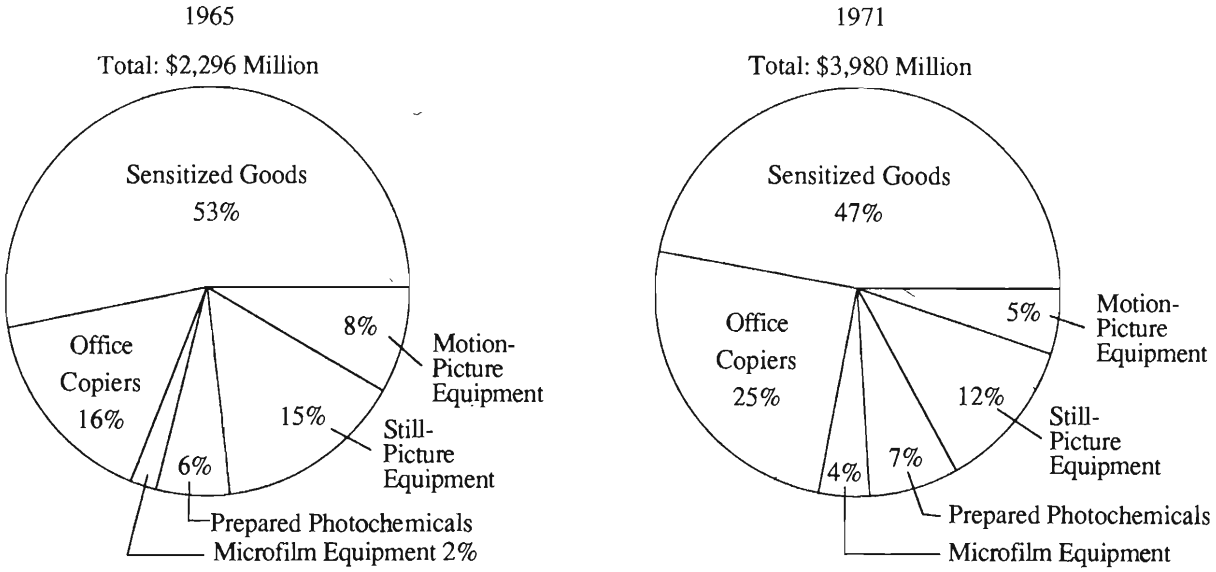
Questions 21-25 refer to the following data.

PRODUCTION OF PHOTOGRAPHIC EQUIPMENT AND SUPPLIES

World Production 1965-1969
(value in millions of dollars)

Country	1965 Value	1965 Percent of Total	1966 Value	1966 Percent of Total	1967 Value	1967 Percent of Total	1968 Value	1968 Percent of Total	1969 Value	1969 Percent of Total
United States ----	2,296	64.5	2,831	67.5	3,138	68.4	3,505	68.4	3,770	67.0
Japan ----------	350	9.8	371	8.9	411	9.0	450	8.8	550	9.8
West Germany---	350	9.8	363	8.7	370	8.1	439	8.6	510	9.1
United Kingdom -	247	7.0	274	6.5	283	6.2	299	5.8	310	5.5
France----------	96	2.7	95	2.3	106	2.3	120	2.4	140	2.5
Belgium --------	95	2.7	104	2.5	107	2.3	115	2.3	130	2.3
Italy ----------	76	2.1	80	1.9	89	2.0	105	2.1	115	2.1
Other countries --	50	1.4	72	1.7	76	1.7	82	1.6	95	1.7
Total -----	3,560	100.0	4,190	100.0	4,580	100.0	5,115	100.0	5,620	100.0

UNITED STATES PRODUCTION



GO ON TO THE NEXT PAGE.

21. In 1969 the value of photographic equipment and supplies produced outside the United States was how many million dollars?

(A) 550
(B) 1,850
(C) 5,620
(D) 7,470
(E) 11,240

22. What was the value, in millions of dollars, of the motion-picture equipment produced in the United States in 1971 ?

(A) 184
(B) 188
(C) 193
(D) 199
(E) 203

23. In 1965 which country's total production of photographic equipment and supplies was nearest in value to the combined production of motion-picture and microfilm equipment in the United States in the same year?

(A) Italy
(B) France
(C) United Kingdom
(D) West Germany
(E) Japan

24. In 1965 the value of sensitized goods produced in the United States was approximately what percent of the value of photographic equipment and supplies produced in the world?

(A) 60%
(B) 50%
(C) 45%
(D) 40%
(E) 35%

25. From 1968 to 1969, the value of photographic equipment and supplies produced by Japan increased by approximately what percent?

(A) 22%
(B) 18%
(C) 15%
(D) 12%
(E) 10%

GO ON TO THE NEXT PAGE.

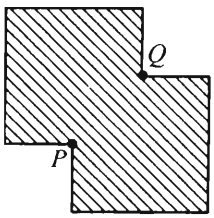
26. For which of the following sets of numbers is the product of the three numbers less than each member of the set?

I. $\frac{1}{4}, \frac{2}{3}, \frac{3}{4}$

II. $-\frac{1}{2}, -1, 4$

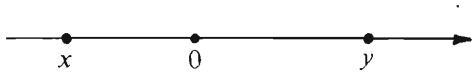
III. $-2, 3, 5$

(A) I only
(B) II only
(C) III only
(D) I and III
(E) II and III



27. The figure above is formed by two overlapping squares, each having sides of 6 centimeters in length. If P and Q are the midpoints of the intersecting sides, what is the area, in square centimeters, of the shaded region?

(A) 72
(B) 63
(C) 60
(D) 54
(E) 45



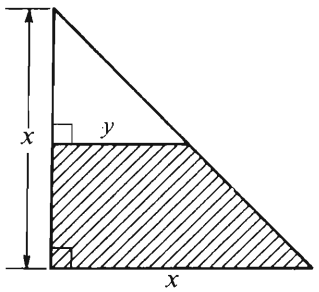
28. If x and y are numbers on the number line above, which of the following statements must be true?

I. $xy < 0$
II. $x + y < 0$
III. $x - y < 0$

(A) I only
(B) III only
(C) I and II only
(D) I and III only
(E) I, II, and III

29. If x is an odd negative integer and y is an even positive integer, then xy must be which of the following?

(A) Odd and positive
(B) Odd and negative
(C) Even and positive
(D) Even and negative
(E) It cannot be determined from the information given.



30. Which of the following expresses the area of the shaded region in the figure above?

(A) $\frac{x^2 - y^2}{2}$

(B) $\frac{x^2 + y^2}{2}$

(C) $x^2 - y^2$

(D) $\frac{x^2 + xy}{4}$

(E) $\frac{x^2 - xy}{4}$

FOR GENERAL TEST 3 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 3			Section 5		
Number	Answer	P+	Number	Answer	P+
1	C	93	1	A	89
2	C	91	2	B	82
3	D	79	3	E	56
4	D	69	4	C	55
5	C	68	5	D	45
6	E	54	6	D	42
7	B	58	7	A	49
8	C	90	8	D	86
9	D	70	9	E	91
10	A	49	10	E	75
11	D	46	11	B	52
12	E	36	12	E	44
13	C	34	13	C	43
14	D	28	14	D	32
15	B	31	15	D	28
16	C	53	16	B	29
17	B	26	17	B	82
18	D	76	18	E	67
19	A	50	19	C	54
20	B	56	20	D	68
21	E	58	21	A	55
22	B	70	22	B	89
23	A	70	23	C	61
24	C	84	24	C	70
25	D	66	25	A	47
26	A	40	26	A	56
27	B	85	27	B	43
28	E	87	28	C	85
29	D	79	29	C	90
30	A	78	30	A	81
31	C	70	31	C	81
32	D	54	32	E	72
33	E	32	33	D	37
34	B	33	34	C	37
35	A	24	35	E	37
36	E	22	36	A	27
37	B	22	37	A	24
			38	B	18

QUANTITATIVE ABILITY					
Section 2			Section 6		
Number	Answer	P+	Number	Answer	P+
1	A	90	1	A	83
2	A	90	2	C	74
3	B	80	3	B	80
4	A	80	4	D	75
5	C	62	5	A	71
6	B	66	6	B	77
7	D	61	7	A	66
8	D	52	8	D	66
9	A	59	9	C	57
10	B	54	10	D	51
11	D	49	11	D	45
12	C	41	12	C	47
13	D	18	13	B	41
14	C	38	14	C	33
15	A	32	15	A	29
16	C	83	16	B	90
17	E	80	17	C	82
18	D	62	18	C	77
19	A	50	19	E	69
20	B	66	20	E	62
21	C	79	21	B	93
22	C	90	22	D	85
23	B	76	23	C	75
24	B	71	24	E	57
25	A	45	25	A	45
26	A	49	26	D	46
27	C	47	27	B	64
28	A	46	28	D	54
29	D	43	29	D	62
30	E	22	30	A	35

ANALYTICAL ABILITY					
Section 1			Section 4		
Number	Answer	P+	Number	Answer	P+
1	B	76	1	D	90
2	C	83	2	A	86
3	B	69	3	D	59
4	E	32	4	E	56
5	E	34	5	A	59
6	E	51	6	C	68
7	D	95	7	C	61
8	C	62	8	B	75
9	D	72	9	C	76
10	A	60	10	D	88
11	C	57	11	C	83
12	B	54	12	E	41
13	B	57	13	D	33
14	E	38	14	D	24
15	B	66	15	E	18
16	E	54	16	D	60
17	A	29	17	E	38
18	E	24	18	D	52
19	E	51	19	C	73
20	D	60	20	A	68
21	B	48	21	B	59
22	E	35	22	C	50
23	D	62	23	B	72
24	B	61	24	A	64
25	A	19	25	E	38

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 3 ONLY AND THE PERCENTS BELOW*

Raw Score	Scaled Scores and Percents Below						Raw Score	Scaled Scores and Percents Below					
	Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below		Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below
72-75	800	99					39	440	38	590	57	670	85
71	790	99					38	430	36	580	54	660	83
70	770	99					37	420	33	570	52	650	81
							36	410	30	560	49	630	76
69	760	99					35	400	27	550	48	620	74
68	750	98					34	390	24	540	45	610	72
67	730	97					33	380	22	530	42	600	69
66	720	96					32	380	22	510	37	580	64
65	710	95					31	370	20	500	35	570	61
64	700	95					30	360	16	490	32	560	58
63	680	93											
62	670	92					29	350	14	480	30	540	52
61	660	90					28	340	12	470	28	530	49
60	650	89	800	97			27	340	12	460	26	520	46
							26	330	10	450	24	500	40
59	640	87	800	97			25	320	9	430	20	490	38
58	630	85	790	96			24	310	7	420	18	470	32
57	610	82	780	94			23	300	6	410	16	460	31
56	600	80	770	93			22	290	5	390	13	440	24
55	590	78	760	92			21	280	4	380	12	420	20
54	580	76	750	89			20	270	3	360	9	410	18
53	570	74	740	88									
52	560	72	730	86			19	260	2	350	7	390	15
51	550	69	720	84			18	250	1	340	6	380	13
50	540	67	710	82	800	99	17	240	1	320	5	360	10
							16	230	1	310	4	340	7
49	530	64	700	80	800	99	15	220	0	290	2	330	6
48	520	61	690	78	800	99	14	200	0	270	2	310	4
47	510	59	680	77	790	98	13	200	0	260	1	290	3
46	500	56	670	74	770	97	12	200	0	240	1	280	2
45	490	54	660	72	760	96	11	200	0	230	0	260	1
44	480	51	640	68	740	95	10	200	0	220	0	250	1
43	470	48	630	66	730	94							
42	460	44	620	63	710	91	9	200	0	210	0	240	1
41	450	41	610	61	700	90	8	200	0	200	0	220	0
40	450	41	600	59	690	88	7	200	0	200	0	210	0
							0-6	200	0	200	0	200	0

*Percent scoring below the scaled score is based on the performance of 923,359 examinees who took the General Test between October 1, 1986, and September 30, 1989.

TEST 4

SECTION 1

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Although adolescent maturational and developmental states occur in an orderly sequence, their timing ------- with regard to onset and duration.

   (A) lasts (B) varies (C) falters
   (D) accelerates (E) dwindles

2. Many of the earliest colonial houses that are still standing have been so modified and enlarged that the ------- design is no longer -------.

   (A) pertinent. .relevant
   (B) intended. .necessary
   (C) embellished. .attractive
   (D) appropriate. .applicable
   (E) initial. .discernible

3. While the delegate clearly sought to ------- the optimism that has emerged recently, she stopped short of suggesting that the conference was near collapse and might produce nothing of significance.

   (A) substantiate (B) dampen (C) encourage
   (D) elucidate (E) rekindle

4. The old man could not have been accused of ------- his affection; his conduct toward the child betrayed his ------- her.

   (A) lavishing. .fondness for
   (B) sparing. .tolerance of
   (C) rationing. .antipathy for
   (D) stinting. .adoration of
   (E) promising. .dislike of

5. A leading chemist believes that many scientists have difficulty with stereochemistry because much of the relevant nomenclature is -------, in that it combines concepts that should be kept -------.

   (A) obscure. .interrelated
   (B) specialized. .intact
   (C) subtle. .inviolate
   (D) descriptive. .separate
   (E) imprecise. .discrete

6. Among the many ------- of the project, expense cannot be numbered; the goals of the project's promoters can be achieved with impressive -------.

   (A) highlights. .efficiency
   (B) features. .savings
   (C) disadvantages. .innovation
   (D) claims. .speed
   (E) defects. .economy

7. Though science is often imagined as a ------- exploration of external reality, scientists are no different from anyone else: they are ------- human beings enmeshed in a web of personal and social circumstances.

   (A) fervent. .vulnerable
   (B) neutral. .rational
   (C) painstaking. .careless
   (D) disinterested. .passionate
   (E) cautious. .dynamic

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. DRAWBRIDGE : CASTLE :: (A) lawn : house (B) gangway : ship (C) aisle : stage (D) hallway : building (E) sidewalk : garage

9. INSULIN : PANCREAS :: (A) bile : liver (B) menthol : eucalyptus (C) oxygen : heart (D) honey : bee (E) vanilla : bean

10. TALON : EAGLE :: (A) fang : snake (B) hoof : horse (C) quill : porcupine (D) tusk : elephant (E) claw : panther

11. ARTICULATE : CLEARLY ::
(A) orate : strongly
(B) shout : loudly
(C) lecture : willfully
(D) malign : incoherently
(E) jest : belligerently

12. NUANCE : DISTINCTION ::
(A) remnant : preservation
(B) shade : spectrum
(C) hint : suggestion
(D) trace : existence
(E) splinter : disintegration

13. URBANE : GAUCHERIE ::
(A) confident : coterie
(B) calculating : imposture
(C) diffident : goodwill
(D) fearful : destruction
(E) guileless : chicanery

14. VOTING : ROLL CALL ::
(A) termination : cloture
(B) amendment : constitution
(C) majority : concession
(D) quorum : filibuster
(E) investigation : legislation

15. DEMUR : QUALMS ::
(A) placate : pique
(B) obligate : benevolence
(C) atrophy : rehabilitation
(D) manipulate : experience
(E) waver : irresoluteness

16. MISER : THRIFT ::
(A) performer : artistry
(B) chauvinist : patriotism
(C) mimic : ridicule
(D) politician : compromise
(E) scientist : discovery

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Of Homer's two epic poems, the *Odyssey* has always been more popular than the *Iliad*, perhaps because it includes more features of mythology that are accessible to readers. Its subject (to use Maynard Mack's categories) is "life-as-spectacle," for readers, diverted by its various incidents, observe its hero Odysseus primarily from without; the tragic *Iliad*, however, presents "life-as-experience": readers are asked to identify with the mind of Achilles, whose motivations render him a not particularly likable hero. In addition, the *Iliad*, more than the *Odyssey*, suggests the complexity of the gods' involvement in human actions, and to the extent that modern readers find this complexity a needless complication, the *Iliad* is less satisfying than the *Odyssey*, with its simpler scheme of divine justice. Finally, since the *Iliad* presents a historically verifiable action, Troy's siege, the poem raises historical questions that are absent from the *Odyssey*'s blithely imaginative world.

17. The author uses Mack's "categories" (lines 4-5) most probably in order to
    (A) argue that the *Iliad* should replace the *Odyssey* as the more popular poem
    (B) indicate Mack's importance as a commentator on the *Iliad* and the *Odyssey*
    (C) suggest one way in which the *Iliad* and the *Odyssey* can be distinguished
    (D) point out some of the difficulties faced by readers of the *Iliad* and the *Odyssey*
    (E) demonstrate that the *Iliad* and the *Odyssey* can best be distinguished by comparing their respective heroes

18. The author suggests that the variety of incidents in the *Odyssey* is likely to deter the reader from
    (A) concentrating on the poem's mythological features
    (B) concentrating on the psychological states of the poem's central character
    (C) accepting the explanations that have been offered for the poem's popularity
    (D) accepting the poem's scheme of divine justice
    (E) accepting Maynard Mack's theory that the poem's subject is "life-as-spectacle"

19. The passage is primarily concerned with
    (A) distinguishing arguments
    (B) applying classifications
    (C) initiating a debate
    (D) resolving a dispute
    (E) developing a contrast

20. It can be inferred from the passage that a reader of the *Iliad* is likely to have trouble identifying with the poem's hero for which of the following reasons?
    (A) The hero is eventually revealed to be unheroic.
    (B) The hero can be observed by the reader only from without.
    (C) The hero's psychology is not historically verifiable.
    (D) The hero's emotions often do not seem appealing to the reader.
    (E) The hero's emotions are not sufficiently various to engage the reader's attention.

GO ON TO THE NEXT PAGE.

Flatfish, such as the flounder, are among the few vertebrates that lack approximate bilateral symmetry (symmetry in which structures to the left and right of the body's midline are mirror images). Most striking among the many asymmetries evident in an adult flatfish is eye placement: before maturity one eye migrates, so that in an adult flatfish both eyes are on the same side of the head. While in most species with asymmetries virtually all adults share the same asymmetry, members of the starry flounder species can be either left-eyed (both eyes on the left side of head) or right-eyed. In the waters between the United States and Japan, the starry flounder populations vary from about 50 percent left-eyed off the United States West Coast, through about 70 percent left-eyed halfway between the United States and Japan, to nearly 100 percent left-eyed off the Japanese coast.

Biologists call this kind of gradual variation over a certain geographic range a "cline" and interpret clines as strong indications that the variation is adaptive, a response to environmental differences. For the starry flounder this interpretation implies that a geometric difference (between fish that are mirror images of one another) is adaptive, that left-eyedness in the Japanese starry flounder has been selected for, which provokes a perplexing question: what is the selective advantage in having both eyes on one side rather than on the other?

The ease with which a fish can reverse the effect of the sidedness of its eye asymmetry simply by turning around has caused biologists to study internal anatomy, especially the optic nerves, for the answer. In all flatfish the optic nerves cross, so that the right optic nerve is joined to the brain's left side and vice versa. This crossing introduces an asymmetry, as one optic nerve must cross above or below the other. G. H. Parker reasoned that if, for example, a flatfish's left eye migrated when the right optic nerve was on top, there would be a twisting of nerves, which might be mechanically disadvantageous. For starry flounders, then, the left-eyed variety would be selected against, since in a starry flounder the left optic nerve is uppermost.

The problem with the above explanation is that the Japanese starry flounder population is almost exclusively left-eyed, and natural selection never promotes a purely less advantageous variation. As other explanations proved equally untenable, biologists concluded that there is no important adaptive difference between left-eyedness and right-eyedness, and that the two characteristics are genetically associated with some other adaptively significant characteristic. This situation is one commonly encountered by evolutionary biologists, who must often decide whether a characteristic is adaptive or selectively neutral. As for the left-eyed and right-eyed flatfish, their difference, however striking, appears to be an evolutionary red herring.

21. According to the passage, starry flounder differ from most other species of flatfish in that starry flounder

(A) are not basically bilaterally symmetric
(B) do not become asymmetric until adulthood
(C) do not all share the same asymmetry
(D) have both eyes on the same side of the head
(E) tend to cluster in only certain geographic regions

22. The author would be most likely to agree with which of the following statements about left-eyedness and right-eyedness in the starry flounder?

I. They are adaptive variations by the starry flounder to environmental differences.
II. They do not seem to give obvious selective advantages to the starry flounder.
III. They occur in different proportions in different locations.

(A) I only
(B) II only
(C) I and III only
(D) II and III only
(E) I, II, and III

23. According to the passage, a possible disadvantage associated with eye migration in flatfish is that the optic nerves can

(A) adhere to one another
(B) detach from the eyes
(C) cross
(D) stretch
(E) twist

GO ON TO THE NEXT PAGE.

24. Which of the following best describes the organization of the passage as a whole?

(A) A phenomenon is described and an interpretation presented and rejected.
(B) A generalization is made and supporting evidence is supplied and weighed.
(C) A contradiction is noted and a resolution is suggested and then modified.
(D) A series of observations is presented and explained in terms of the dominant theory.
(E) A hypothesis is introduced and corroborated in the light of new evidence.

25. The passage supplies information for answering which of the following questions?

(A) Why are Japanese starry flounder mostly left-eyed?
(B) Why should the eye-sidedness in starry flounder be considered selectively neutral?
(C) Why have biologists recently become interested in whether a characteristic is adaptive or selectively neutral?
(D) How do the eyes in flatfish migrate?
(E) How did Parker make his discoveries about the anatomy of optic nerves in flatfish?

26. Which of the following is most clearly similar to a cline as it is described in the second paragraph of the passage?

(A) A vegetable market in which the various items are grouped according to place of origin
(B) A wheat field in which different varieties of wheat are planted to yield a crop that will bring the maximum profit
(C) A flower stall in which the various species of flowers are arranged according to their price
(D) A housing development in which the length of the front struts supporting the porch of each house increases as houses are built up the hill
(E) A national park in which the ranger stations are placed so as to be inconspicuous, and yet as easily accessible as possible

27. Which of the following phrases from the passage best expresses the author's conclusion about the meaning of the difference between left-eyed and right-eyed flatfish?

(A) "Most striking" (line 4)
(B) "variation is adaptive" (line 19)
(C) "mechanically disadvantageous" (lines 37-38)
(D) "adaptively significant" (lines 48-49)
(E) "evolutionary red herring" (line 54)

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. VAGUE: (A) expressive (B) felicitous (C) well-defined (D) nearly perfect (E) closely matched

29. FOCUS: (A) disappear (B) disperse (C) link (D) activate (E) layer

30. PROLOGUE: (A) soliloquy (B) trilogy (C) analogue (D) dialogue (E) epilogue

31. DISARM: (A) hold close (B) put on guard (C) challenge (D) entertain (E) instruct

32. INFLATE: (A) converge (B) inhibit (C) audit (D) minimize (E) detect

33. INDIGENOUS: (A) thoughtful (B) acquired (C) redundant (D) unworthy (E) sterile

34. QUELL: (A) foment (B) divert (C) confirm (D) convoke (E) delay

35. EGRESS:
(A) entrance
(B) decline
(C) wide variation
(D) inadequate amount
(E) lateral movement

36. PIED: (A) delicately formed (B) precisely detailed (C) solid-colored (D) smooth (E) luminous

37. GAINSAY:
(A) fail
(B) destroy
(C) speak in support of
(D) receive compensation for
(E) regard with disgust

38. COMPLAISANCE: (A) churlishness (B) emptiness (C) difficulty (D) swiftness (E) vibrancy

SECTION 2

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

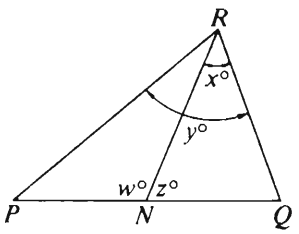
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

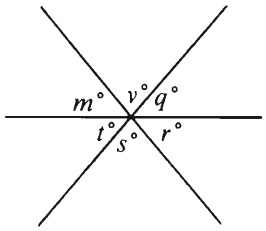


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

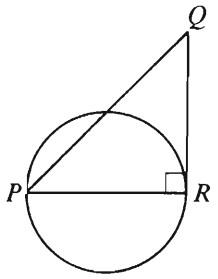
	Column A	Column B
1.	2% of (3 + 2)	3% of (2 + 3)
2.	$\frac{6}{7} - \frac{5}{6}$	$\frac{5}{6} - \frac{6}{7}$
	$2y - x = 11$ $x - 2 = 5$	
3.	x	y
4.	The remainder when 48 is divided by 5	The remainder when 48 is divided by 7
	$xy = 0$ and $x = 0$	
5.	x	y
6.	$\sqrt{38} + \sqrt{45}$	12



$m = q$, $t = 50$

7.	$q + r$	s

	Column A	Column B
8.	$\frac{x + 2y}{2}$	$\frac{2x + 4y}{4}$



PR is a diameter of the circle, and QR is tangent to the circle.

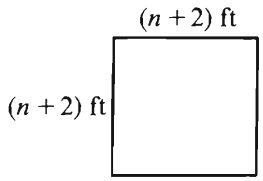
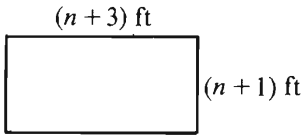
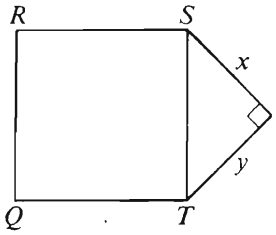
9.	The length of PR	The length of QR

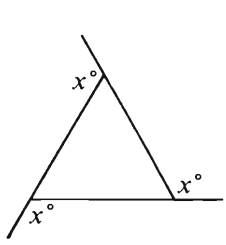
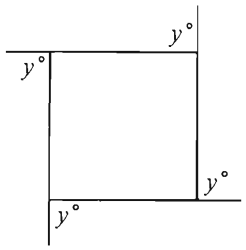
The toll for a certain bridge is \$0.15 or 1 token. Tokens are sold in packs of 40 for \$4.00.

10.	The percent saved on 40 trips across the bridge if a token, rather than \$0.15, is used to pay each toll	$66\frac{2}{3}\%$

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

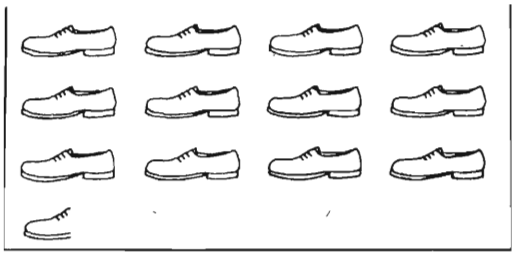
	Column A	Column B
11.		
12.	The average (arithmetic mean) cost per cassette for 18 cassettes costing a total of $2x$ dollars	The average (arithmetic mean) cost per cassette for 3 cassettes costing a total of $\frac{x}{3}$ dollars
13.	 Square $QRST$ has perimeter p.	$x^2 + y^2$
		$\frac{p^2}{16}$

	Column A	Column B
	N is an integer and $0 < N < 3$.	
14.	$\left(\frac{1}{N} + 1\right)^N$	$2 + \frac{1}{8}$
15.	  $x - y$	$\frac{x + y}{7}$

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

PAIRS OF SHOES SOLD BY COMPANY S



Note: Drawn to scale.

16. If 8,750 pairs of shoes are represented in the pictograph above, how many pairs of shoes does each  represent?

(A) 350 (B) 700 (C) 730
(D) 830 (E) 1,400

17. If $x = 3$ and $y = -3$, what is the value of $(3 + x)(3 - y)$?

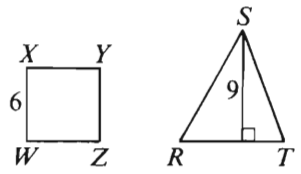
(A) -36 (B) -12 (C) 0 (D) 12 (E) 36

18. $\dfrac{6^2 - 4^2}{2^2} =$

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

19. If the area of a circle is 25π, then the diameter of the circle is

(A) 5
(B) 10
(C) 20
(D) 25
(E) 50



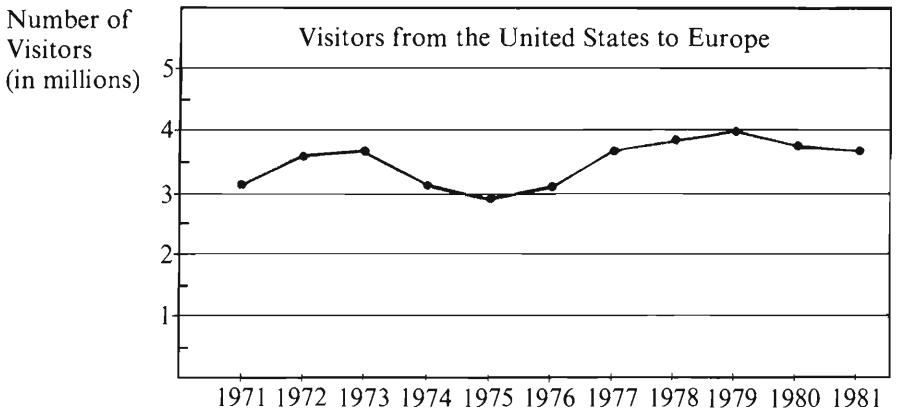
20. In the figures above, if the area of square region $WXYZ$ is equal to the area of triangular region RST, then $RT =$

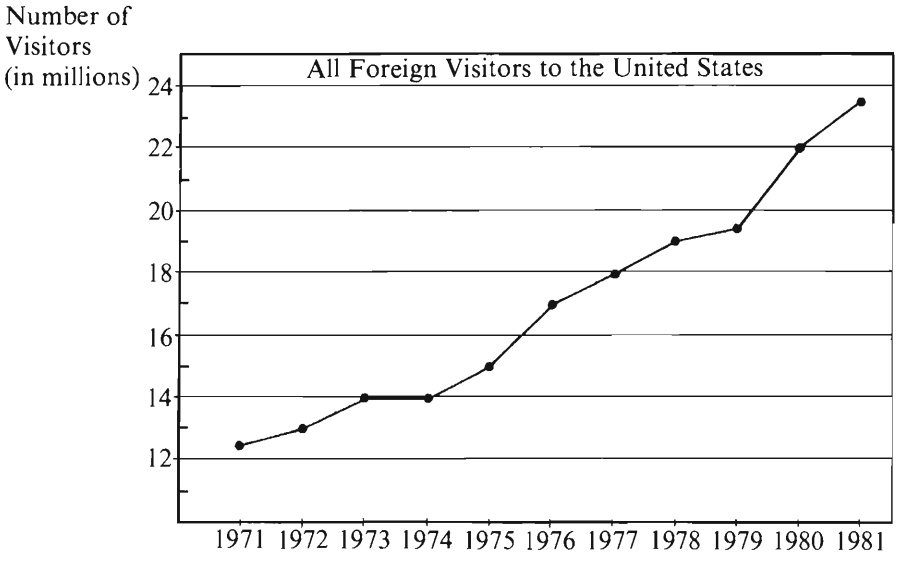
(A) 2 (B) $\frac{24}{9}$ (C) 4 (D) $\frac{48}{9}$ (E) 8

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graphs.

VISITORS TO AND FROM THE UNITED STATES, 1971-1981





21. The total number of visitors from the United States to Europe for 1973 and 1974 was most nearly equal to the total number for which two of the following years?

(A) 1976 and 1977
(B) 1977 and 1978
(C) 1978 and 1979
(D) 1979 and 1980
(E) 1980 and 1981

22. There were approximately how many million more foreign visitors to the United States in 1980 than in 1975 ?

(A) 22 (B) 15 (C) 8 (D) 7 (E) 0.75

GO ON TO THE NEXT PAGE.

23. In 1980 there were 17.1 million foreign visitors to New York City. This was approximately what percent of the total number of foreign visitors to the United States?

(A) 5%
(B) 22%
(C) 73%
(D) 78%
(E) 88%

24. How many years after 1971 show an increase over the previous year in both the number of visitors from the United States to Europe and the number of foreign visitors to the United States?

(A) Five (B) Six (C) Seven
(D) Eight (E) Nine

25. In 1975 if 60 percent of the foreign visitors to the United States were not from Europe, then the number of European visitors to the United States was approximately how many times as great as the number of visitors from the United States to Europe that year?

(A) 2
(B) 3
(C) 5
(D) 6
(E) 12

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26. If $y = 2x - 1$, what is the value of x in terms of y?

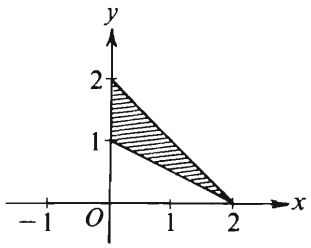
(A) $\frac{y}{2} - 1$

(B) $\frac{y}{2} - \frac{1}{2}$

(C) $\frac{y}{2} + \frac{1}{2}$

(D) $\frac{y}{2} + 1$

(E) $y + \frac{1}{2}$



27. In the figure above, what is the area of the shaded region?

(A) 1 (B) 2 (C) $2\sqrt{2}$ (D) 3 (E) 4

28. If $n = 15 \times 28 \times 26$, which of the following is NOT an integer?

(A) $\frac{n}{15}$ (B) $\frac{n}{21}$ (C) $\frac{n}{32}$ (D) $\frac{n}{35}$ (E) $\frac{n}{39}$

29. How many positive integers less than 20 are equal to the sum of a positive multiple of 3 and a positive multiple of 4?

(A) Two
(B) Five
(C) Seven
(D) Ten
(E) Nineteen

30. Two tanks, X and Y, are filled to capacity with jet fuel. Tank X holds 600 gallons more than tank Y. If 100 gallons of fuel were to be pumped from each tank, tank X would then contain 3 times as much fuel as tank Y. What is the total number of gallons of fuel in the two full tanks?

(A) 1,400
(B) 1,200
(C) 1,000
(D) 900
(E) 800

SECTION 3

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-3

Students at the Elmwood College of Natural Science must complete a total of twelve courses selected from three different general areas—humanities, natural science, and social science—in order to graduate. The students must meet the following course distribution requirements:

At least six of the required twelve courses must be from natural science.

At least five of the required twelve courses must be from humanities and social science, with at least one, but no more than three, selected from humanities.

1. If a student has completed six natural science courses, all of the following are possible groups of courses that fulfill the course distribution requirements EXCEPT

   (A) three humanities courses and three social science courses
   (B) two humanities courses and four social science courses
   (C) one humanities course, one natural science course, and four social science courses
   (D) one humanities course, two natural science courses, and three social science courses
   (E) three humanities courses, one natural science course, and two social science courses

2. The minimum number of social science courses required in order to fulfill the course distribution requirements is

   (A) 1
   (B) 2
   (C) 3
   (D) 4
   (E) 5

3. If a student has completed six natural science courses and one social science course, the possible groups of courses to fulfill the course distribution requirements must include at least

   (A) two humanities courses
   (B) three humanities courses
   (C) one natural science course
   (D) one social science course
   (E) three social science courses

GO ON TO THE NEXT PAGE.

4. One of the world's most celebrated paintings, *The Man with the Golden Helmet*, long attributed to Rembrandt, is not a Rembrandt after all. So say several art experts, who base their conclusion on an analysis of stylistic features, especially details both of shading and of brushwork. In order to ascertain who really painted the well-known masterpiece, the experts have begun a series of sophisticated new tests, including one that involves the activation of neutrons. These tests yield patterns for any painter that are as distinctive as a good set of fingerprints.

   Which of the following is an assumption on which the conclusion of the art experts depends?

   (A) *The Man with the Golden Helmet* was not painted during Rembrandt's lifetime.
   (B) If even *The Man with the Golden Helmet* is of questionable attribution, then any supposedly authentic Rembrandt has now become suspect.
   (C) The painting known as *The Man with the Golden Helmet* is a copy of a Rembrandt original.
   (D) The original ascription of *The Man with the Golden Helmet* to Rembrandt was a deliberate fraud.
   (E) There are significant consistencies among authentic Rembrandts in certain matters of style.

5. A placebo is a chemically inert substance prescribed more for the mental relief of a patient than for its effect on the patient's physical disorder. It is prescribed in the hope of instilling in the patient a positive attitude toward prospects for his or her recovery. In some cases, the placebo actually produces improvement in the patient's condition. In discussing the use and effect of placebos, a well-known medical researcher recently paid physicians the somewhat offbeat compliment of saying that physicians were the ultimate placebo.

   By comparing a physician to a placebo, the researcher sought to imply that

   (A) physicians should always maintain and communicate an optimistic attitude toward their patients, regardless of the prognosis
   (B) the health of some patients can improve simply from their knowledge that they are under a physician's care
   (C) many patients actually suffer from imagined illnesses that are best treated by placebos
   (D) physicians could prescribe less medication and achieve the same effect
   (E) it is difficult to determine what, if any, effect a physician's behavior has on a patient's condition

6. The Occupational Safety and Health Administration (OSHA) was established to protect workers from accidents and unsafe conditions on the job. There has actually been an increase in the number of job-related accidents under OSHA. This demonstrates the agency's ineffectiveness.

   Which of the following, if true concerning the period during which the increase occurred, most seriously weakens the argument above?

   (A) A number of job categories, excluded from the jurisdiction of OSHA in the legislation originally establishing the agency, have continued to be outside OSHA's jurisdiction.
   (B) OSHA has been assigned a greater number of kinds of workplace activities to monitor.
   (C) There has been an increase in the total number of people at work, and the ratio of work-related deaths and injuries to size of work force has fallen in OSHA-supervised occupations
   (D) Regulations issued by OSHA have met with political criticism from elected officials and the mass media.
   (E) The increase in job-related accidents has occurred mainly in a single job category, whereas the number of job-related accidents has remained approximately constant in other categories.

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Questions 7-10

A garden plot consists of seven parallel rows of vegetables, the rows numbered consecutively one through seven. In each row a different one of seven vegetables—J, K, L, M, N, O, P—is to be grown according to the following conditions:

Neither J nor K can be in a row next to the row P is in.
M must be grown in either row one or row seven.
L must be grown in a row next to a row containing either N or P, or in a row that is the only row between the rows containing N and P.
If O is next to only one other row of vegetables, that row must contain K.

7. If P is next to M, and O is in the seventh row, in which row must P be planted?

(A) 2 (B) 3 (C) 4 (D) 5 (E) 6

8. Which of the following is a possible order for the vegetables in the garden plot, beginning with row one?

(A) L J K N P O M
(B) M P J L N K O
(C) M N L P O J K
(D) M N L P J K O
(E) N P L J M O K

9. If O is in the first row and J is in the sixth row, which vegetable must be in the fourth row?

(A) K (B) L (C) M (D) N (E) P

10. If J, K, L, N, and P are in the inner five rows, which of the following is a possible ordering of these vegetables in the five rows?

(A) J K L P N
(B) J N L P K
(C) K L J N P
(D) K N P L J
(E) L J K N P

GO ON TO THE NEXT PAGE.

Questions 11-16

A museum curator must group nine paintings—F, G, H, J, K, L, M, N, and O—in twelve spaces numbered consecutively from 1-12. The paintings must be in three groups, each group representing a different century. The groups must be separated from each other by at least one unused wall space. Three of the paintings are from the eighteenth century, two from the nineteenth century, and four from the twentieth century.

Unused wall spaces cannot occur within groups.
G and J are paintings from different centuries.
J, K, and L are all paintings from the same century.
Space number 5 is always empty.
F and M are eighteenth-century paintings.
N is a nineteenth-century painting.

11. If space 4 is to remain empty, which of the following is true?

(A) Space number 10 must be empty.
(B) The groups of paintings must be hung in chronological order by century.
(C) An eighteenth-century painting must be hung in space 3.
(D) A nineteenth-century painting must be hung in space 1.
(E) A twentieth-century painting must be hung in space 12.

12. If the paintings are hung in reverse chronological order by century, the unused wall spaces could be

(A) 1, 5, and 10
(B) 1, 6, and 10
(C) 4, 7, and 8
(D) 5, 8, and 12
(E) 5, 9, and 10

13. Which of the following is a space that CANNOT be occupied by a nineteenth-century painting?

(A) Space 1
(B) Space 6
(C) Space 8
(D) Space 11
(E) Space 12

14. If J hangs in space 11, which of the following is a possible arrangement for spaces 8 and 9 ?

(A) F in 8 and M in 9
(B) K in 8 and G in 9
(C) N in 8 and G in 9
(D) 8 unused and H in 9
(E) 8 unused and F in 9

15. If the twentieth-century paintings are hung in spaces 1- 4, which of the following CANNOT be true?

(A) Space 8 is unused.
(B) Space 9 is unused.
(C) F is hung in space 6.
(D) M is hung in space 12.
(E) N is hung in space 9.

16. If the first five paintings, in numerical order of spaces, are F, O, M, N, G, which of the following must be true?

(A) Either space 1 or space 4 is unused.
(B) Either space 7 or space 12 is unused.
(C) H hangs in space 11.
(D) Two unused spaces separate the eighteenth-century and nineteenth-century paintings.
(E) Two unused spaces separate the nineteenth-century and twentieth-century paintings.

GO ON TO THE NEXT PAGE.

Questions 17-22

In a telecommunications-cable assembly plant, cables are assembled by twisting plastic-coated wires together. There are wires of exactly six different solid colors—red, yellow, violet, green, white, and black. Wires must be assembled into single cables according to the following rules:

Each cable must contain at least three wires and wires of at least three different colors.
At most two wires in a single cable can be black.
At most two wires in a single cable can be white.
There can be at most one wire of each of the other colors in a single cable.
If one wire is red, then one wire must be yellow.
If one wire is violet, then no wire can be green.

17. Which of the following could be the complete set of wires in an acceptable cable?

(A) A green wire, a white wire, and a violet wire
(B) A violet wire, a black wire, and a white wire
(C) A red wire, a black wire, and a green wire
(D) A yellow wire and exactly two black wires
(E) Exactly two black wires and exactly two white wires

18. The maximum number of wires that can be used in an acceptable cable is

(A) 8
(B) 7
(C) 6
(D) 5
(E) 4

19. If exactly one black wire and exactly one white wire are used in an assembled cable, which of the following must be true?

(A) The cable contains no more than five wires.
(B) The cable contains exactly six wires.
(C) The cable contains a yellow wire.
(D) The cable does not contain a red wire.
(E) The cable does not contain a violet wire.

20. If a white wire and a violet wire must be among the wires chosen for a particular cable, any of the following pairs of wires could complete the cable EXCEPT a

(A) black wire and a second white wire
(B) yellow wire and a second white wire
(C) yellow wire and a black wire
(D) red wire and a yellow wire
(E) red wire and a black wire

21. If an assembled cable consists of exactly five wires, each a different color, it could be true that a color NOT used is

(A) black
(B) white
(C) green
(D) red
(E) yellow

22. If there is an additional requirement that violet must be used if yellow is used, which of the following must be true?

(A) No cable contains fewer than six wires.
(B) No cable contains more than five wires.
(C) Green is never used if red is used.
(D) Red is always used if violet is used.
(E) Black is used exactly once if yellow is used.

GO ON TO THE NEXT PAGE.

23. Being an only child has little to do with a child's social development. A recent study that followed thirty only children and thirty-five first-born children to the age of three found that the two groups of children behaved very similarly to each other toward their peers, their parents, and other adults.

Which of the following, if true, most weakens the conclusion drawn above?

(A) The groups being compared did not contain the same number of children.
(B) More time was spent observing the interactions of children with their mothers than with their fathers.
(C) Most of the researchers involved in the study were persons who had no brothers or sisters.
(D) The first-born children were, on the average, nearly three when their parents had second children.
(E) The "other adults" described in the study consisted mainly of members of the research team.

24. Manufacturers of household appliances in the United States are introducing an array of computerized technologies in the work of many of their factories in an effort to regain a lead eroded by international competition. On the basis of changes that have already taken place, experts predict a golden age for the consumer of better-designed and better-built products.

Which of the following, if true, would LEAST support the experts' claim that appliances produced by computerized technologies will be better built?

(A) Computerized inventory procedures ensure that parts are ordered in sufficient quantities and that production moves smoothly and consistently.
(B) Computer-directed machines carry out repetitive tasks with the result that errors due to human fatigue are eliminated.
(C) Computer-controlled ultrasound devices are better able to detect hidden flaws and defects that require repair than are human inspectors.
(D) The flow of heat used to weld parts together is more consistent when directed by computer programs and results in a more accurate and uniform weld.
(E) Computer-driven screwdrivers ensure that screws used in appliances will be consistently tight.

25. Geographers and historians have traditionally held the view that Antarctica was first sighted around 1820, but some sixteenth-century European maps show a body that resembles the polar landmass, even though explorers of the period never saw it. Some scholars, therefore, argue that the continent must have been discovered and mapped by the ancients, whose maps are known to have served as models for the European cartographers.

Which of the following, if true, is most damaging to the inference drawn by the scholars?

(A) The question of who first sighted Antarctica in modern times is still much debated, and no one has been able to present conclusive evidence.
(B) Between 3,000 and 9,000 years ago, the world was warmer than it is now, and the polar landmass was presumably smaller.
(C) There are only a few sixteenth-century global maps that show a continental landmass at the South Pole.
(D) Most attributions of surprising accomplishments to ancient civilizations or even extraterrestrials are eventually discredited or rejected as preposterous.
(E) Ancient philosophers believed that there had to be a large landmass at the South Pole to balance the northern continents and make the world symmetrical.

SECTION 4
Time—30 minutes
38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Social scientists have established fairly clear-cut ------- that describe the appropriate behavior of children and adults, but there seems to be ------- about what constitutes appropriate behavior for adolescents.

   (A) functions. .rigidity
   (B) estimates. .indirectness
   (C) norms. .confusion
   (D) regulations. .certainty
   (E) studies. .misapprehension

2. As long as nations cannot themselves accumulate enough physical power to dominate all others, they must depend on -------.

   (A) allies (B) resources (C) freedom
   (D) education (E) self-determination

3. We realized that John was still young and impressionable, but were nevertheless surprised at his -------.

   (A) naïveté (B) obstinateness (C) decisiveness
   (D) ingeniousness (E) resolve

4. Although Mount Saint Helens has been more ------- during the last 4,500 years than any other volcano in the coterminous United States, its long dormancy before its recent eruption ------- its violent nature.

   (A) awe-inspiring. .restrained
   (B) gaseous. .confirmed
   (C) explosive. .belied
   (D) familiar. .moderated
   (E) volatile. .suggested

5. Changes of fashion and public taste are often ------- and resistant to analysis, and yet they are among the most ------- gauges of the state of the public's collective consciousness.

   (A) transparent. .useful
   (B) ephemeral. .sensitive
   (C) faddish. .underutilized
   (D) arbitrary. .problematic
   (E) permanent. .reliable

6. The poet W. H. Auden believed that the greatest poets of his age were almost necessarily irresponsible, that the possession of great gifts ------- the ------- to abuse them.

   (A) negates. .temptation
   (B) controls. .resolution
   (C) engenders. .propensity
   (D) tempers. .proclivity
   (E) obviates. .inclination

7. The self-important cant of musicologists on record jackets often suggests that true appreciation of the music is an ------- process closed to the uninitiated listener, however enthusiastic.

   (A) unreliable (B) arcane (C) arrogant
   (D) elementary (E) intuitive

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. FORGERY : COUNTERFEIT ::
   (A) duplicity : testimony
   (B) arson : insurance
   (C) embezzlement : fraud
   (D) theft : punishment
   (E) murder : life

9. NICOTINE : TOBACCO ::
   (A) calcium : bone (B) iodine : salt
   (C) protein : meat (D) pulp : fruit
   (E) caffeine : coffee

10. CANDLE : WAX ::
   (A) metal : corrosion
   (B) leather : vinyl
   (C) curtain : pleat
   (D) tire : rubber
   (E) wood : ash

11. BIT : DRILL ::
   (A) nut : bolt (B) nail : hammer
   (C) blade : razor (D) stapler : paper
   (E) chisel : stone

12. MISJUDGE : ASSESS ::
   (A) misconstrue : interpret
   (B) misconduct : rehearse
   (C) misinform : design
   (D) misguide : duplicate
   (E) misperceive : explain

13. COMPLIANT : SERVILE ::
   (A) trusting : gullible
   (B) cringing : fawning
   (C) pleasant : effortless
   (D) adventurous : courageous
   (E) arduous : futile

14. ASTRINGENT : CONTRACTION ::
   (A) anesthetic : insensibility
   (B) analgesic : pain
   (C) coagulant : euphoria
   (D) stimulant : drowsiness
   (E) emollient : irritation

15. NOMINAL : FIGUREHEAD ::
   (A) absolute : autocrat
   (B) cloistered : bishop
   (C) military : tribunal
   (D) statutory : defendant
   (E) monolithic : legislature

16. PHILOSOPHER : COGITATE ::
   (A) linguist : prevaricate
   (B) politician : capitulate
   (C) scholar : extemporize
   (D) misanthrope : repeat
   (E) iconoclast : attack

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

If a supernova (the explosion of a massive star) triggered star formation from dense clouds of gas and dust, and if the most massive star to be formed from the cloud evolved into a supernova and triggered a new round of star formation, and so on, then a chain of star-forming regions would result. If many such chains were created in a differentially rotating galaxy, the distribution of stars would resemble the observed distribution in a spiral galaxy.

This line of reasoning underlies an exciting new theory of spiral-galaxy structure. A computer simulation based on this theory has reproduced the appearance of many spiral galaxies without assuming an underlying density wave, the hallmark of the most widely accepted theory of the large-scale structure of spiral galaxies. That theory maintains that a density wave of spiral form sweeps through the central plane of a galaxy, compressing clouds of gas and dust, which collapse into stars that form a spiral pattern.

17. The primary purpose of the passage is to

(A) describe what results when a supernova triggers the creation of chains of star-forming regions
(B) propose a modification in the most widely accepted theory of spiral-galaxy structure
(C) compare and contrast the roles of clouds of gas and dust in two theories of spiral-galaxy structure
(D) describe a new theory of spiral-galaxy structure and contrast it with the most widely accepted theory
(E) describe a new theory of spiral-galaxy structure and discuss a reason why it is inferior to the most widely accepted theory

18. The passage implies that, according to the new theory of spiral-galaxy structure, a spiral galaxy can be created by supernovas when the supernovas are

(A) producing an underlying density wave
(B) affected by a density wave of spiral form
(C) distributed in a spiral pattern
(D) located in the central plane of a galaxy
(E) located in a differentially rotating galaxy

19. Which of the following, if true, would most discredit the new theory as described in the passage?

(A) The exact mechanism by which a star becomes a supernova is not yet completely known and may even differ for different stars.
(B) Chains of star-forming regions like those postulated in the new theory have been observed in the vicinity of dense clouds of gas and dust.
(C) The most massive stars formed from supernova explosions are unlikely to evolve into supernovas.
(D) Computer simulations of supernovas provide a poor picture of what occurs just before a supernova explosion.
(E) A density wave cannot compress clouds of gas and dust to a density high enough to create a star.

20. The author's attitude toward the new theory of spiral-galaxy structure can best be described as

(A) euphoric (B) enthusiastic (C) concerned (D) critical (E) disputatious

GO ON TO THE NEXT PAGE.

The first mention of slavery in the statutes of the English colonies of North America does not occur until after 1660—some forty years after the importation of the first Black people. Lest we think that slavery existed in fact before it did in law, Oscar and Mary Handlin assure us that the status of Black people down to the 1660's was that of servants. A critique of the Handlins' interpretation of why legal slavery did not appear until the 1660's suggests that assumptions about the relation between slavery and racial prejudice should be reexamined, and that explanations for the different treatment of Black slaves in North and South America should be expanded.

The Handlins explain the appearance of legal slavery by arguing that, during the 1660's, the position of White servants was improving relative to that of Black servants. Thus, the Handlins contend, Black and White servants, heretofore treated alike, each attained a different status. There are, however, important objections to this argument. First, the Handlins cannot adequately demonstrate that the White servant's position was improving during and after the 1660's; several acts of the Maryland and Virginia legislatures indicate otherwise. Another flaw in the Handlins' interpretation is their assumption that prior to the establishment of legal slavery there was no discrimination against Black people. It is true that before the 1660's Black people were rarely called slaves. But this should not overshadow evidence from the 1630's on that points to racial discrimination without using the term slavery. Such discrimination sometimes stopped short of lifetime servitude or inherited status—the two attributes of true slavery—yet in other cases it included both. The Handlins' argument excludes the real possibility that Black people in the English colonies were never treated as the equals of White people.

This possibility has important ramifications. If from the outset Black people were discriminated against, then legal slavery should be viewed as a reflection and an extension of racial prejudice rather than, as many historians including the Handlins have argued, the cause of prejudice. In addition, the existence of discrimination before the advent of legal slavery offers a further explanation for the harsher treatment of Black slaves in North than in South America. Freyre and Tannenbaum have rightly argued that the lack of certain traditions in North America—such as a Roman conception of slavery and a Roman Catholic emphasis on equality—explains why the treatment of Black slaves was more severe there than in the Spanish and Portuguese colonies of South America. But this cannot be the whole explanation since it is merely negative, based only on a lack of something. A more compelling explanation is that the early and sometimes extreme racial discrimination in the English colonies helped determine the particular nature of the slavery that followed.

21. Which of the following statements best describes the organization of lines 1-8 of the passage?

(A) A historical trend is sketched and an exception to that trend is cited.
(B) Evidence for a historical irregularity is mentioned and a generalization from that evidence is advanced.
(C) A paradox about the origins of an institution is pointed out and the author's explanation of the paradox is expounded.
(D) A statement about a historical phenomenon is offered and a possible misinterpretation of that statement is addressed.
(E) An interpretation of the rise of an institution is stated and evidence for that interpretation is provided.

22. Which of the following is the most logical inference to be drawn from the passage about the effects of "several acts of the Maryland and Virginia legislatures" (lines 22-23) passed during and after the 1660's?

(A) The acts negatively affected the pre-1660's position of Black as well as of White servants.
(B) The acts had the effect of impairing rather than improving the position of White servants relative to what it had been before the 1660's.
(C) The acts had a different effect on the position of White servants than did many of the acts passed during this time by the legislatures of other colonies.
(D) The acts, at the very least, caused the position of White servants to remain no better than it had been before the 1660's.
(E) The acts, at the very least, tended to reflect the attitudes toward Black servants that already existed before the 1660's.

GO ON TO THE NEXT PAGE.

23. With which of the following statements regarding the status of Black people in the English colonies of North America before the 1660's would the author be LEAST likely to agree?

(A) Although Black people were not legally considered to be slaves, they were often called slaves.
(B) Although subject to some discrimination, Black people had a higher legal status than they did after the 1660's.
(C) Although sometimes subject to lifetime servitude, Black people were not legally considered to be slaves.
(D) Although often not treated the same as White people, Black people, like many White people, possessed the legal status of servants.
(E) Although apparently subject to more discrimination after 1630 than before 1630, Black people from 1620 to the 1660's were legally considered to be servants.

24. According to the passage, the Handlins have argued which of the following about the relationship between racial prejudice and the institution of legal slavery in the English colonies of North America?

(A) Racial prejudice and the institution of slavery arose simultaneously.
(B) Racial prejudice most often took the form of the imposition of inherited status, one of the attributes of slavery.
(C) The source of racial prejudice was the institution of slavery.
(D) Because of the influence of the Roman Catholic church, racial prejudice sometimes did not result in slavery.
(E) Although existing in a lesser form before the 1660's, racial prejudice increased sharply after slavery was legalized.

25. The passage suggests that the existence of a Roman conception of slavery in Spanish and Portuguese colonies had the effect of

(A) extending rather than causing racial prejudice in these colonies
(B) hastening the legalization of slavery in these colonies
(C) mitigating some of the conditions of slavery for Black people in these colonies
(D) delaying the introduction of slavery into the English colonies
(E) bringing about an improvement in the treatment of Black slaves in the English colonies

26. The author considers the explanation put forward by Freyre and Tannenbaum for the treatment accorded Black slaves in the English colonies of North America to be

(A) ambitious but misguided
(B) valid but limited
(C) popular but suspect
(D) anachronistic and controversial
(E) premature and illogical

27. With which of the following statements regarding the reason for the introduction of legal slavery in the English colonies of North America would the author be most likely to agree?

(A) The introduction is partly to be explained by reference to the origins of slavery, before the 1660's, in the Spanish and Portuguese colonies.
(B) The introduction is to be explained by reference to a growing consensus beginning in the 1630's about what were the attributes of true slavery.
(C) The introduction is more likely to be explained by reference to a decline than to an improvement in the position of White servants in the colonies during and after the 1660's.
(D) The introduction is more likely to be explained by reference to the position of Black servants in the colonies in the 1630's than by reference to their position in the 1640's and 1650's.
(E) The introduction is more likely to be explained by reference to the history of Black people in the colonies before 1660 than by reference to the improving position of White servants during and after the 1660's.

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. ASSET: (A) duty (B) qualification (C) denial (D) liability (E) instability

29. CONCUR: (A) expose (B) incite (C) prolong (D) dissent (E) forgive

30. AMALGAMATE: (A) congregate (B) insulate (C) isolate (D) layer (E) revive

31. FERROUS:
(A) affected by rust
(B) containing no iron
(C) chemically inert
(D) combined with water
(E) permanently magnetized

32. PHLEGMATIC: (A) vivacious (B) valiant (C) arid (D) healthy (E) mature

33. PRODIGIOUS: (A) implicit (B) slight (C) constant (D) unnecessary (E) premature

34. CORROBORATION:
(A) weakening of utility
(B) lessening of certainty
(C) reduction in generality
(D) implausibility
(E) inadequacy

35. PALPABILITY: (A) infertility (B) inflammability (C) intangibility (D) intractability (E) intolerability

36. ALACRITY:
(A) hesitance and reluctance
(B) caution and fear
(C) cynicism and skepticism
(D) suspicion and doubt
(E) concern and anxiety

37. MANNERED: (A) plain (B) infantile (C) progressive (D) ignorant (E) natural

38. DISSEMBLE: (A) act conventionally (B) put together (C) appear promptly (D) behave honestly (E) obtain readily

SECTION 5

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

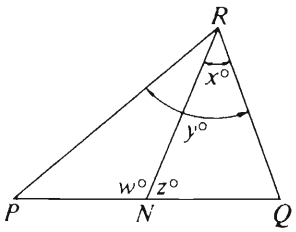
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

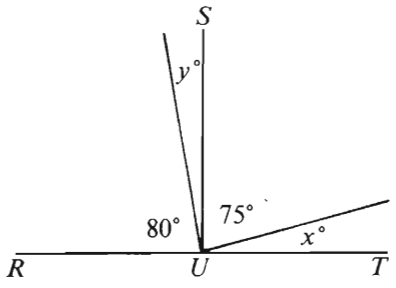
GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	$3x + 4 = 13$ $11 - y = 6$	
1.	$6x$	$4y$

At noon today, Ann, Betty, Cathy, and Dot had exactly \$1 apiece. Then during the next five minutes, Ann gave \$1 to Betty who gave \$2 to Cathy who gave \$3 to Dot. None of them gave or received any other money.

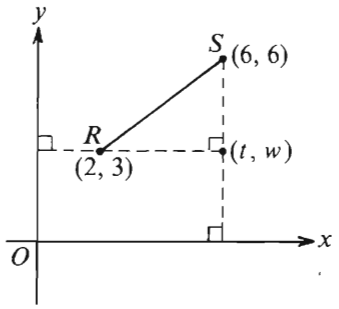
	Column A	Column B
2.	The amount of money Betty had left at five minutes past noon today	The amount of money Cathy had left at five minutes past noon today
3.	The number of prime numbers less than 15	The number of odd integers greater than 5 and less than 15
4.	$\left(\frac{3}{7} \cdot \frac{24}{25}\right) \cdot \frac{7}{3}$	1
	$x + 17 = -8$	
5.	$x + 8$	-17



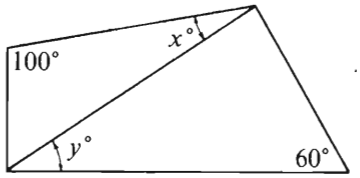
$RT \perp SU$

6.	x	y

	Column A	Column B
	$x > 0$	
7.	$\frac{x}{7}$	$\frac{5}{x}$



8.	t	w
9.	$3^3(125)$	$3^2(375)$
10.	The volume of a cube with edge of length 4 centimeters	Four times the volume of a cube with edge of length 2 centimeters



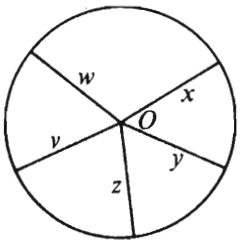
11.	x	y

The sum of 3 integers is 51.

12.	The average (arithmetic mean) of the 3 integers	The median of the 3 integers

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	 The area of the circular region with center O is 16π, and v, w, x, y, and z represent the lengths of the line segments.	
13.	8π	$v + w + x + y + z$

$d > 0$

	Column A	Column B
14.	The total interest earned on d dollars invested for 3 months at 11 percent simple annual interest	$\frac{11}{3}\left(\frac{d}{100}\right)$ dollars

$y > 0,\ y \neq 1$

	Column A	Column B
15.	$\sqrt{y}$	y^2

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. $\dfrac{2 \times 2 \times 2 \times 2 \times 2}{2 + 2 + 2 + 2} =$

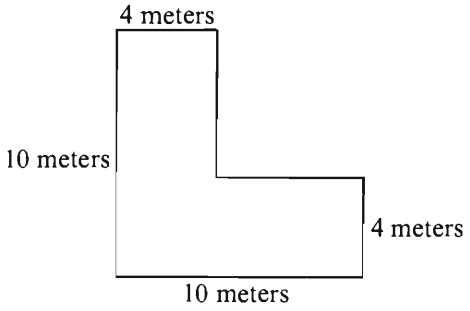
(A) 1 (B) 2 (C) 4 (D) 8 (E) 16

17. Which of the following is a multiple of both 7 and 13 ?

(A) 52 (B) 65 (C) 77 (D) 156 (E) 182

18. Mario purchased \$600 worth of traveler's checks. If each check was worth either \$20 or \$50, which of the following CANNOT be the number of \$20 checks purchased?

(A) 10
(B) 15
(C) 18
(D) 20
(E) 25



19. The figure above shows the floor dimensions of an L-shaped room. All angles shown are right angles. If carpeting costs \$20 per square meter, what will carpeting for the entire floor of the room cost?

(A) \$800
(B) \$1,280
(C) \$1,600
(D) \$1,680
(E) \$2,320

$$\frac{a + \frac{b}{c}}{\frac{d}{e}}$$

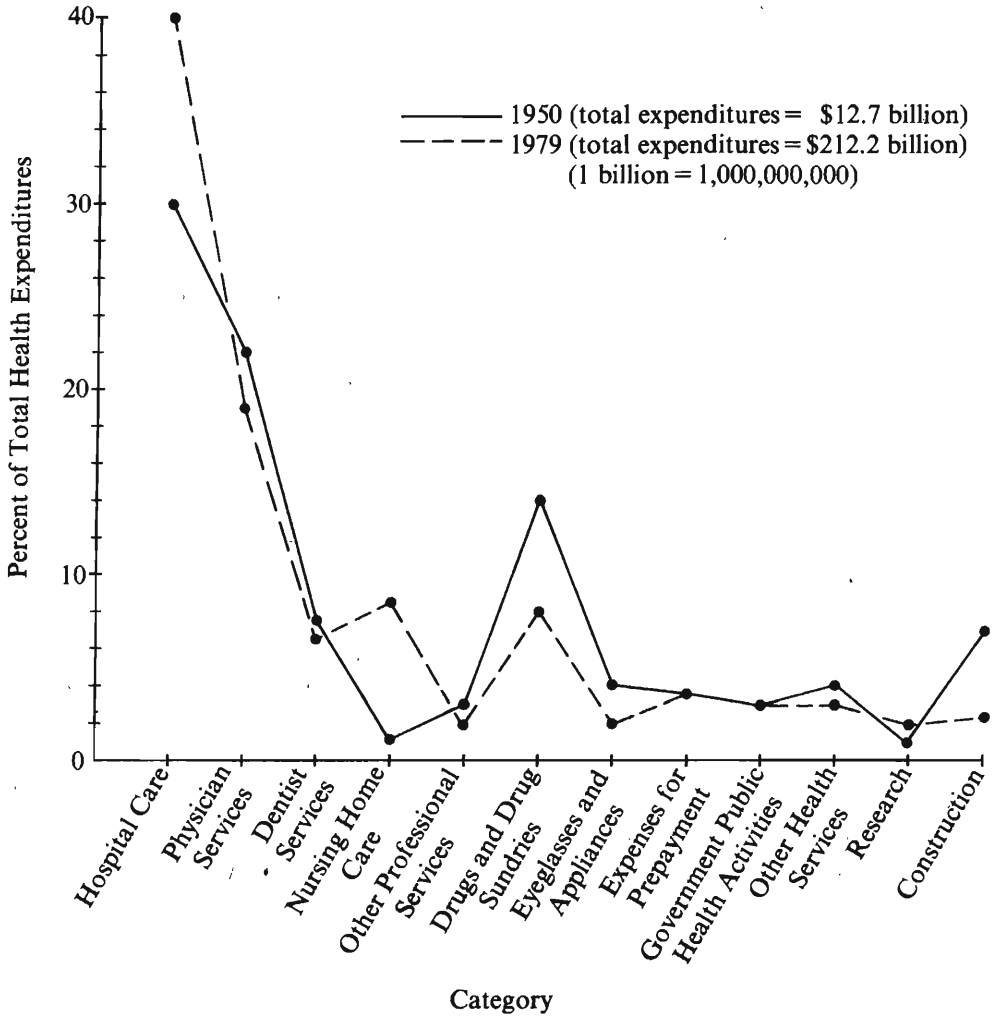
20. If the value of the expression above is to be halved by doubling exactly one of the five numbers a, b, c, d, or e, which should be doubled?

(A) a (B) b (C) c (D) d (E) e

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graph.

HEALTH EXPENDITURES IN THE UNITED STATES,
1950 AND 1979



21. For how many of the categories was the percent of total health expenditures greater in 1979 than in 1950 ?

(A) Two (B) Three (C) Four
(D) Six (E) Seven

22. Of the following categories, for which was the percent of total health expenditures in 1979 least?

(A) Dentist services
(B) Nursing home care
(C) Drugs and drug sundries
(D) Government public health activities
(E) Research

GO ON TO THE NEXT PAGE.

23. In 1979 for how many of the categories was the amount of health expenditures less than $21 billion?

(A) Two (B) Three (C) Nine
(D) Ten (E) Twelve

24. Approximately what was the ratio of health expenditures for hospital care in 1979 to health expenditures for hospital care in 1950 ?

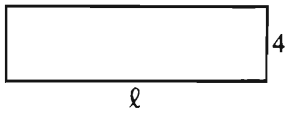
(A) $\frac{22}{1}$
(B) $\frac{17}{1}$
(C) $\frac{15}{1}$
(D) $\frac{25}{2}$
(E) $\frac{4}{3}$

25. Which of the following can be inferred from the graph?

I. The number of patients needing hospital care increased from 1950 to 1979.
II. The dollar amount of health expenditures for construction was greater in 1979 than in 1950.
III. In 1979 the dollar amount of health expenditures for dentist services was more than half the dollar amount of health expenditures for physician services.

(A) I only (B) II only (C) III only
(D) I and II (E) II and III

GO ON TO THE NEXT PAGE.



26. If the perimeter of the rectangle above is 36, then ℓ =

(A) 9 (B) 14 (C) 16 (D) 28 (E) 32

27. If $4x$ is 6 less than $4y$, then $y - x$ =

(A) -24

(B) $-\frac{3}{2}$

(C) $-\frac{2}{3}$

(D) $\frac{3}{2}$

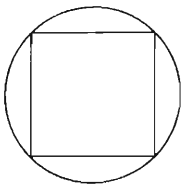
(E) 24

28. The difference between two positive numbers is 16. If the smaller of these two numbers is $\frac{3}{5}$ of the larger, what is the value of the smaller number?

(A) 18
(B) 24
(C) 30
(D) 33
(E) 40

29. $(1 - x)(x - 1)$ =

(A) $-(x - 1)^2$
(B) $(x - 1)^2$
(C) 0
(D) $x^2 - 1$
(E) $1 - x^2$



30. If a square is inscribed in a circle of radius r as shown above, then the area of the square region is

(A) $\frac{r^2}{2\pi}$ (B) $\frac{\pi r^2}{2}$ (C) πr^2 (D) r^2 (E) $2r^2$

SECTION 6

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-5

April Trucking Company trips always begin in one of the five cities served by April—Northtown, Overbridge, Pomona, Quakertown, and Riverside—and always end in one of these cities.

April drivers travel from city to city only on the routes listed in the mileage table below.

Northtown—Overbridge:	100 miles
Northtown—Pomona:	100 miles
Northtown—Riverside:	200 miles
Pomona—Quakertown:	200 miles
Quakertown—Riverside:	300 miles

The routes listed above have no stretch of road in common.

The maximum distance an April driver can travel without making an overnight stop is 300 miles.

Overnight stops must be made in cities served by April.

1. Which of the following is a trip an April driver could make without an overnight stop?

   (A) From Northtown to Riverside to Quakertown
   (B) From Riverside to Quakertown to Pomona
   (C) From Quakertown to Riverside to Northtown
   (D) From Northtown to Pomona to Quakertown
   (E) From Quakertown to Pomona to Northtown to Overbridge

2. What is the minimum number of overnight stops that an April driver who travels from Overbridge to Northtown to Riverside to Quakertown must make before arriving in Quakertown?

   (A) 1 (B) 2 (C) 3 (D) 4 (E) 5

3. What is the maximum number of cities, including the cities where the trip begins and ends, that can be served by an April driver who makes no overnight stops during the course of the trip?

   (A) 2 (B) 3 (C) 4 (D) 5 (E) 6

4. Which of the following is a list of the cities to which an April driver can travel from Pomona, returning to Pomona on the same day he or she left?

   (A) Northtown only
   (B) Overbridge only
   (C) Quakertown only
   (D) Both Northtown and Overbridge
   (E) Both Northtown and Quakertown

5. Which of the following accurately describes the possibilities for overnight stops during trips by April drivers that begin in Overbridge and end in Quakertown after including two other cities served by April?

   (A) The trips can be made without an overnight stop.
   (B) It is not possible to make an overnight stop at Northtown.
   (C) Riverside is the only possible place to make an overnight stop.
   (D) If exactly two overnight stops are made on a trip, they can be made only at Pomona and Riverside.
   (E) Any one of three cities—Northtown, Pomona, and Riverside—is a possible overnight stop.

GO ON TO THE NEXT PAGE.

6. A diet that contains polyunsaturated fats and is low in saturated fats reduces the risk of heart disease. Fish are an excellent source of omega-3, a polyunsaturated fat they obtain by eating the green plant cells of plankton. But cows and other ruminants obtain omega-3 polyunsaturates when they eat grass. Therefore, a diet rich in beef and a diet rich in fish should be equally effective in reducing the risk of heart disease.

   Which of the following, if true, would weaken the conclusion above?

   (A) The diet of beef cattle can be monitored far more accurately than can the diet of fish.
   (B) Consuming polyunsaturates reduces the amount of cholesterol produced by the liver and reduces the chance of blockage in coronary blood vessels.
   (C) Studies have shown that people who eat fish only once a week have a lower risk of heart disease than do people who never eat fish.
   (D) Medical researchers are expected soon to make a synthetic form of omega-3 that can be injected into beef.
   (E) Cows and other ruminants convert most of the omega-3 polyunsaturates they consume into saturated fats.

7. The widespread development of industrial robots is contributing to unemployment; therefore, "intelligent" machines are dangerous.

   The argument above is most like which of the following?

   (A) Mussolini was an evil man; therefore, he became a fascist.
   (B) Eating bacon is harmful to health; therefore, fatty foods are unsafe.
   (C) Some judges are dishonest because they take bribes.
   (D) Whales are in danger of becoming extinct; therefore, we should not trade with countries that allow whales to be hunted.
   (E) Birds are dangerous because they all spread disease.

8. New Jersey has one of the lowest motor vehicle fatality rates in the country, and it is one of the few states that require extensive annual automobile safety inspections. Therefore, all states should adopt similar safety inspection procedures.

   The argument above is based on which of the following assumptions?

   (A) Most states tend to impose few rules and regulations on the automobile drivers operating within those states.
   (B) Most states are skeptical that annual automobile safety inspections can reduce fatality rates.
   (C) Annual automobile safety inspections contribute significantly to holding down New Jersey's fatality rate.
   (D) Drivers in New Jersey are more safety conscious than are drivers in other parts of the country.
   (E) A smaller number of people die on the roads in New Jersey than in most other states.

GO ON TO THE NEXT PAGE.

Questions 9-14

A duty officer is making up an assignment roster for three paramedic teams. Each team will be assigned to exactly one of three sectors of the city: Sector 1, Sector 2, or Sector 3. Each team will consist of two of the following paramedics: Greg, Helen, Ida, Karla, Luther, and Miguel. Each paramedic will be on exactly one team.

Ida, Luther, and Miguel have each completed a special emergency-driver training program; Greg, Helen, and Karla have not.

Greg, Helen, and Ida each have at least three years of job experience; Karla, Luther, and Miguel do not.

The duty officer must observe the following restrictions in making up the assignment roster:

Each team must include at least one paramedic who has completed the special emergency-driver training program.
Each team must include at least one paramedic who has at least three years of job experience.
Greg must be assigned either to Sector 1 or to Sector 2.

9. Which of the following assignment rosters is permitted by the restrictions?

	Sector 1	Sector 2	Sector 3
(A)	Greg and Karla	Helen and Luther	Ida and Miguel
(B)	Greg and Luther	Helen and Karla	Ida and Miguel
(C)	Helen and Miguel	Greg and Luther	Ida and Karla
(D)	Helen and Miguel	Ida and Luther	Greg and Karla
(E)	Ida and Karla	Greg and Helen	Luther and Miguel

10. Which of the following must be true?

(A) Greg will be Karla's partner.
(B) Greg will be Luther's partner.
(C) Helen will be Luther's partner.
(D) Ida will be Karla's partner.
(E) Ida will be Miguel's partner.

11. Which of the following is a complete and accurate list of the paramedics whom the duty officer can assign to be Miguel's partner?

(A) Greg
(B) Helen
(C) Luther
(D) Greg, Helen
(E) Luther, Karla

12. If Helen is assigned to Sector 2, which of the following must be true?

(A) Karla is assigned to Sector 1.
(B) Karla is assigned to Sector 3.
(C) Luther is assigned to Sector 1.
(D) Miguel is assigned to Sector 2.
(E) Miguel is assigned to Sector 3.

13. The duty officer CANNOT make an acceptable roster that assigns

(A) Helen to Sector 1 and Miguel to Sector 3
(B) Ida to Sector 1 and Luther to Sector 2
(C) Karla to Sector 1 and Greg to Sector 2
(D) Greg to Sector 2 and Helen to Sector 3
(E) Ida to Sector 2 and Miguel to Sector 3

14. If Luther is assigned to Sector 3, which of the following must be true?

(A) Helen is assigned to Sector 1.
(B) Ida is assigned to Sector 2.
(C) Miguel is assigned to Sector 1.
(D) Greg is Luther's partner.
(E) Greg is Miguel's partner.

GO ON TO THE NEXT PAGE.

Questions 15-19

A professional violinist has agreed to give lessons to seven talented violin students—Fiona, Gerhard, Hugh, Isabel, Julia, Kent, and Leon—and for this purpose has set aside an hour each weekday, Monday through Friday. The week's schedule of lessons must meet the following conditions:

Each student must be scheduled for exactly one of the five days.
Exactly two of the lessons must each be for two students, but those two joint lessons cannot be on consecutive days.
Fiona's lesson must be on a day earlier in the week than Gerhard's lesson.
Hugh must be scheduled to be given his lesson by himself.
Isabel's lesson must be on the day immediately before the day of Julia's lesson.

15. Which of the following is an acceptable weekly schedule of lessons?

	Monday	Tuesday	Wednesday	Thursday	Friday
(A)	Fiona	Julia, Kent	Isabel, Leon	Hugh	Gerhard
(B)	Hugh	Fiona, Gerhard	Isabel	Julia, Kent	Leon
(C)	Isabel	Julia	Fiona, Hugh	Gerhard	Kent, Leon
(D)	Kent, Leon	Hugh	Isabel	Fiona, Julia	Gerhard
(E)	Leon	Julia, Kent	Hugh	Fiona, Isabel	Gerhard

16. If Hugh's lesson is scheduled for Wednesday, Isabel's lesson must be scheduled for either

(A) Monday or Tuesday
(B) Monday or Thursday
(C) Monday or Friday
(D) Tuesday or Thursday
(E) Tuesday or Friday

17. The latest day in the week on which Fiona and Isabel could be given a joint lesson is

(A) Monday (B) Tuesday
(C) Wednesday (D) Thursday
(E) Friday

18. If a joint lesson for Gerhard and Julia is scheduled earlier in the week than a joint lesson for Kent and Leon, for which day must Hugh's lesson be scheduled?

(A) Monday (B) Tuesday
(C) Wednesday (D) Thursday
(E) Friday

19. If the two joint lessons are scheduled for as early in the week as possible, and Isabel's and Julia's lessons for as late in the week as possible, Leon could be given his lesson

(A) with Gerhard
(B) with Isabel
(C) with Julia
(D) with Kent
(E) by himself

GO ON TO THE NEXT PAGE.

Questions 20-22

A book club holds two discussion sessions each summer. The discussion leader of the club is selecting two groups of books—Group 1 and Group 2—for the sessions. She is choosing from seven books—T, U, V, W, X, Y, and Z. Group 1 will contain four of the books and Group 2 will contain the other three books. The leader must select the books for each group according to the following restrictions:

T cannot be in the same group as U.
If X is in Group 2, Z must also be in Group 2.
If Z is in Group 1, W must also be in Group 1.

20. If T and Z are in Group 2, any of the following books can also be in Group 2 EXCEPT

(A) U
(B) V
(C) W
(D) X
(E) Y

21. If Z is in Group 1, which of the following must be true?

(A) T is in Group 1.
(B) V is in Group 2.
(C) X is in Group 2.
(D) U is in the same group as V.
(E) W is in the same group as Y.

22. If X is in Group 2, which of the following must be true?

(A) T is in Group 2.
(B) U is in Group 2.
(C) W is in Group 1.
(D) Y is in the same group as Z.
(E) Z is in the same group as U.

23. A population study based on a "microdata sample," a sample just large enough to allow reasonably accurate projections, found that in 1984 there had been a dramatic reversal of a twenty-year tendency toward migration of United States residents older than sixty to small towns and rural regions, both within and across state boundaries. This finding turns out to have been in error. The problem was that people who had moved to the United States from abroad were accidentally counted as part of interstate migration that year.

Which of the following can be inferred from the passage above?

(A) In 1984 the majority of people coming to the United States from abroad were over the age of sixty.
(B) In 1984 fewer United States residents over the age of sixty changed residence than in any of the twenty years prior to 1984.
(C) People over the age of sixty who in 1984 came to the United States from abroad did not settle predominantly in small towns and rural regions.
(D) The microdata sample for 1984 that was used in the demographic study cited was too small to allow any meaningful projections.
(E) The twenty-year trend mentioned in the passage was due chiefly to moves over relatively short distances, mostly within the same state.

GO ON TO THE NEXT PAGE.

24. The average age and racing experience of the drivers at the Indianapolis 500 automobile race increased each year between 1965 and 1980. The reason for the increase is that high-speed racing drivers were living longer than their predecessors. Race-car safety features that reduced the severity of crashes of the kind that formerly took drivers' lives were primarily responsible for the increase in the average age of the Indianapolis 500 competitors.

Which of the following, if true, would be most likely to be part of the evidence used to show that safety features on the cars that protected drivers in major crashes were responsible for the increase in the average age of drivers at the Indianapolis race?

(A) Younger drivers at high-speed racetracks were involved in major accidents at a slightly higher rate than were older drivers between 1965 and 1980.
(B) Major accidents on high-speed racetracks occurred at about the same frequency in the years after 1965 as in the years before 1965.
(C) The average age of drivers attempting to qualify for the Indianapolis 500 decreased slightly between 1965 and 1980.
(D) Accidents on highways in the United States occurred at about the same frequency in the years after 1965 as in the years before 1965.
(E) Other safety features, involving the condition of the racetrack and the uniforms worn by the drivers while driving, were adopted at Indianapolis between 1965 and 1980.

*25. John Cleland, best known for his novel *Fanny Hill*, is becoming the Vivaldi of eighteenth-century literature in that his cult is promoted by people who do not much care for the period as a whole and who cheerfully ignore the work of its greatest masters.

It can be inferred that the author of the passage above believes which of the following?

(A) Cleland was more esteemed as a writer in his own time than he is in ours.
(B) Few people know much about the period in which Cleland wrote.
(C) Most eighteenth-century novels deserve more attention than *Fanny Hill*.
(D) The cult of Vivaldi has developed more recently than that of Cleland.
(E) Vivaldi was not one of the greatest masters of his time.

FOR GENERAL TEST 4 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 1			Section 4		
Number	Answer	P+	Number	Answer	P+
1	B	96	1	C	89
2	E	89	2	A	92
3	B	60	3	A	71
4	D	51	4	C	60
5	E	39	5	B	41
6	E	39	6	C	47
7	D	28	7	B	38
8	B	84	8	C	91
9	A	61	9	E	92
10	E	64	10	D	87
11	B	65	11	C	76
12	C	49	12	A	71
13	E	36	13	A	52
14	A	29	14	A	37
15	E	35	15	A	41
16	B	22	16	E	19
17	C	70	17	D	63
18	B	57	18	E	51
19	E	82	19	C	36
20	D	58	20	B	84
21	C	56	21	D	48
22	D	40	22	D	42
23	E	63	23	A	27
24	A	53	24	C	45
25	B	50	25	C	60
26	D	46	26	B	61
27	E	63	27	E	45
28	C	90	28	D	84
29	B	84	29	D	77
30	E	80	30	C	73
31	B	74	31	B	74
32	D	75	32	A	39
33	B	54	33	B	44
34	A	35	34	B	46
35	A	37	35	C	45
36	C	39	36	A	35
37	C	33	37	E	20
38	A	23	38	D	10

QUANTITATIVE ABILITY					
Section 2			Section 5		
Number	Answer	P+	Number	Answer	P+
1	B	93	1	B	84
2	A	87	2	C	87
3	B	82	3	A	82
4	B	85	4	B	85
5	D	77	5	C	84
6	A	71	6	A	80
7	A	74	7	D	77
8	C	69	8	A	65
9	D	62	9	C	64
10	B	66	10	A	61
11	A	65	11	D	62
12	C	53	12	D	53
13	C	37	13	A	55
14	D	45	14	B	35
15	C	37	15	D	30
16	B	81	16	C	91
17	E	80	17	E	87
18	E	91	18	C	88
19	B	56	19	B	76
20	E	62	20	D	63
21	A	90	21	B	70
22	D	90	22	E	91
23	D	68	23	D	77
24	B	54	24	A	22
25	A	46	25	B	27
26	C	65	26	B	68
27	A	52	27	D	53
28	C	43	28	B	60
29	D	27	29	A	54
30	A	34	30	E	43

ANALYTICAL ABILITY					
Section 3			Section 6		
Number	Answer	P+	Number	Answer	P+
1	D	73	1	D	88
2	B	72	2	A	75
3	D	51	3	B	61
4	E	74	4	A	66
5	B	80	5	E	44
6	C	65	6	E	83
7	A	72	7	B	56
8	C	54	8	C	82
9	E	53	9	C	77
10	D	50	10	D	51
11	C	54	11	D	75
12	D	58	12	B	40
13	A	43	13	A	37
14	D	43	14	E	41
15	E	32	15	D	66
16	A	33	16	B	58
17	B	64	17	C	35
18	B	38	18	D	32
19	A	43	19	A	27
20	E	30	20	A	72
21	C	61	21	B	27
22	C	42	22	C	36
23	D	49	23	C	47
24	A	39	24	B	41
25	E	30	25	E	30

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

Untuk Indonesia,
ITB,
LPDP students

SCORE CONVERSIONS FOR GENERAL TEST 4 ONLY AND THE PERCENTS BELOW*

Raw Score	Scaled Scores and Percents Below*						Raw Score	Scaled Scores and Percents Below*					
	Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below		Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below
72-76	800	99					40	450	42	570	52	710	91
71	790	99					39	450	42	550	48	700	90
70	770	99					38	440	39	540	45	690	89
69	760	99					37	430	36	530	43	680	87
68	750	98					36	420	34	520	40	670	85
67	730	97					35	410	30	510	38	650	82
66	720	96					34	400	27	490	33	640	80
65	710	96					33	400	27	480	30	630	77
64	700	95					32	390	25	470	29	620	75
63	690	94					31	380	23	460	26	600	70
62	670	92					30	370	21	450	24	590	68
61	660	91					29	360	17	430	20	580	65
60	650	89	800	98			28	360	17	420	18	560	59
59	640	88	790	97			27	350	15	410	16	550	57
58	630	86	780	95			26	340	13	400	15	530	51
57	620	84	770	94			25	330	11	390	13	520	47
56	610	83	760	93			24	320	10	370	10	500	42
55	600	81	750	90			23	310	8	360	9	490	39
54	590	79	730	87			22	300	7	350	8	470	33
53	580	77	720	85			21	300	7	340	7	450	28
52	570	75	710	83			20	290	5	330	6	440	25
51	560	73	700	81			19	280	4	310	4	420	21
50	550	70	690	79	800	99	18	270	3	300	3	400	17
49	540	67	670	75	800	99	17	260	2	290	3	380	13
48	530	65	660	73	800	99	16	250	2	280	2	370	12
47	520	62	650	71	790	98	15	240	1	270	2	350	9
46	510	59	640	69	780	98	14	230	1	250	1	330	6
45	500	57	630	66	770	97	13	220	1	240	1	310	5
44	490	54	610	62	760	96	12	210	0	230	1	290	3
43	480	51	600	60	750	96	11	200	0	220	0	270	2
42	470	48	590	57	740	95	10	200	0	210	0	260	2
41	460	45	580	55	730	94	9	200	0	200	0	240	1
							8	200	0	200	0	220	0
							7	200	0	200	0	210	0
							0-6	200	0	200	0	200	0

*Percent scoring below the scaled score based on the performance of the 876,691 examinees who took the General Test between October 1, 1985, and September 30, 1988.

TEST 5

SECTION 1

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-3

Packing labels identify individual packages by means of a four-symbol identification code running left to right. The symbols used are the four digits 1, 2, 3, and 4 and the four letters W, X, Y, and Z.

Each code consists of two digits and two letters.
The two digits must be next to each other, and the two letters must be next to each other.
Of the two digits, the one to the left must be less than the one to the right.
The two letters must be different letters.

1. Which of the following could be the third symbol in a code in which the fourth symbol is 3 ?

   (A) W
   (B) X
   (C) Z
   (D) 1
   (E) 4

2. Which of the following must be true of any code in which the letter W occurs?

   (A) The letter X also occurs in that code.
   (B) The letter Y also occurs in that code.
   (C) The letter Z also occurs in that code.
   (D) The letter W occurs in that code exactly once.
   (E) The letter W occurs in that code exactly twice.

3. If the first symbol in a code is 2, any one of the following symbols could occur in one of the remaining three positions EXCEPT the

   (A) digit 1
   (B) digit 3
   (C) digit 4
   (D) letter Y
   (E) letter Z

4. Bats emit sounds and generally use the echoes of these sounds highly efficiently to detect, locate, and catch their prey. However, it is claimed that the characteristic efficiency of this process is reduced by moths able to hear the sounds emitted by insect-eating bats.

   Which of the following statements, if true, best supports the claim above?

   (A) Those moths that cannot hear the sounds emitted by insect-eating bats live longer on the average than those that can hear such sounds when both kinds of moth are in an environment continuously free of such bats.
   (B) Those moth species that cannot hear the sounds emitted by insect-eating bats are among the species of insects that are most likely to be caught by such bats.
   (C) When a moth changes its speed or direction of flight, there is a change in the sound pattern generated by the moth's wing movements.
   (D) Moth species that can hear the sounds emitted by insect-eating bats are less likely to be caught by such bats than are moth species that cannot hear these sounds.
   (E) Moths that are capable of hearing the sounds emitted by insect-eating bats differ in their abilities to use evasive action to escape capture by such bats.

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5. Mass transit authorities in large cities are struggling with deficits. Riders complain about delays and breakdowns, cuts in service, and fares higher than they are accustomed to paying. For all these reasons and because the price of gasoline is still not prohibitive, the number of passengers using public transportation has fallen, adding to the deficits.

   Which of the following statements about the relationship between the number of riders using public transportation and the price of gasoline is best supported by the passage above?

   (A) As the price of gasoline rises, the number of riders using public transportation rises.
   (B) Even if the price of gasoline rises, the number of riders using public transportation will continue to decline.
   (C) If the price of gasoline rises to a prohibitive level, the number of riders using public transportation will rise.
   (D) The majority of riders using public transportation do not use gasoline; hence, fluctuations in gasoline prices are unlikely to affect the number of riders using public transportation.
   (E) The price of gasoline is always low enough to make private transportation cheaper than public transportation; hence, fluctuations in gasoline prices are unlikely to affect the number of riders using public transportation.

6. The popular notion that teachers are generally apathetic about microcomputer technology is false, or at least dated: a recently published survey indicates that 86 percent of the 5,000 teachers who responded to survey questionnaires expressed a high level of interest in microcomputers.

   Which of the following, if true, would be most damaging to the argument above?

   (A) No attempt was made in the survey to determine whether the teachers who received questionnaires had any previous experience with microcomputers.
   (B) Teachers who are interested in microcomputer technology were more likely than others to complete and return their questionnaires.
   (C) Questionnaires were sent to teachers without regard to their areas of subject-matter expertise or teaching experience.
   (D) There have been several important developments in the classroom applications of microcomputer technology since the survey results were tabulated.
   (E) The survey was conducted as part of a marketing study by a company that manufactures and sells microcomputers.

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Questions 7-11

Four women—G, H, I, and J—and four men—R, S, T, and U—are the eight people to be seated at a rectangular table. Three of the people are to sit on one side of the table, three are to sit on the other side of the table, one is to sit at the head of the table, and one is to sit at the foot of the table. The following restrictions on seating arrangements must be observed:

Persons of the same sex cannot sit next to each other on the same side of the table.
The person seated at the foot of the table cannot be the same sex as the person seated at the head of the table.
T cannot be seated on the same side of the table as I.
U cannot be seated on the same side of the table as J.

7. If U is seated at the head of the table and I is seated in the middle seat on one side of the table, which of the following must be true?

(A) J is seated at the foot of the table.
(B) R is seated at the foot of the table.
(C) G is seated on the same side of the table as I.
(D) S is seated on the opposite side of the table from I.
(E) T is seated on the opposite side of the table from I.

8. If J is to be seated at the head of the table, each of the following could be seated at the foot of the table EXCEPT

(A) H
(B) R
(C) S
(D) T
(E) U

9. If S is seated at the foot of the table, U is seated in an end seat on one side of the table, and I is seated in an end seat on the other side of the table, where must T be seated?

(A) At the head of the table
(B) In the middle seat on the same side of the table as U
(C) In an end seat on the same side of the table as U
(D) In the middle seat on the same side of the table as I
(E) In an end seat on the same side of the table as I

10. If T is seated at the head of the table, R is seated in the middle seat on one side of the table, and I is seated in the middle seat on the other side of the table, which of the following can be true?

(A) G is seated at the foot of the table.
(B) H is seated on the same side of the table as I.
(C) J is seated on the same side of the table as I.
(D) S is seated on the same side of the table as R.
(E) U is seated on the same side of the table as R.

11. If T is seated at the foot of the table, U is seated in the middle seat on one side of the table, and I is seated in the middle seat on the other side of the table, which of the following must be seated at the head of the table?

(A) G
(B) H
(C) J
(D) R
(E) S

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Questions 12-17

Exactly five persons—J, K, L, M, and O—have gathered to play a game called Trios. In each round of the game, exactly three of these persons must play. The following are all the rules that affect the order of participation in, and the length of, an individual game:

No person can play in three consecutive rounds.
No person can sit out two consecutive rounds.
In any game, each of the five persons must play in exactly three rounds.

12. If J, K, and L play in a first round, which of the following could be the trio who play in that game's second round?

(A) J, K, M
(B) J, K, O
(C) J, L, M
(D) K, L, O
(E) K, M, O

13. If, in an individual game, K, L, and M play in the first round and J, L, and M play in the third round, the players in the second round must be

(A) J, K, L
(B) J, K, M
(C) J, K, O
(D) K, L, O
(E) K, M, O

14. If, in an individual game, L and O do not play in the first round, which of the following must be true?

(A) L plays in rounds three and four.
(B) O plays in rounds three and five.
(C) L and O both play in round four.
(D) L and O both play in round five.
(E) M and O both play in round four.

15. If, in an individual game, J, L, and M play in the first round, and K, M, and O play in the second round, which of the following must play in the fourth round?

(A) J
(B) K
(C) L
(D) M
(E) O

16. If, in an individual game, J, M, and O play in the first round, and if M and K play in the fourth round, which of the following CANNOT have played in the third round?

(A) J
(B) K
(C) L
(D) M
(E) O

17. If, in an individual game, J, K, and M play in the first round and K, M, and O play in the third round, which of the following CANNOT play in the fourth round and must play in the fifth round?

(A) J
(B) K
(C) L
(D) M
(E) O

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Questions 18-22

A theater ensemble group consisting of two male actors—Jeff and Kirk—and three female actors—Rena, Sara, and Tanya—plans to give a performance of a play that has exactly eight roles. Roles 1, 2, and 3 must be played by males; roles 4, 5, and 6 must be played by females. Roles 7 and 8 can be played by either males or females. Each actor must play at least one role, and the number of roles necessitates that some of the actors will play more than one role. The pairs of roles below are the only pairs that do not require the actors playing the roles to be on stage at the same time; appearances in these roles are spaced far enough apart to allow time for costume changes for actors playing more than one role.

Roles 1 and 2
Roles 3 and 6
Roles 3 and 7
Roles 4 and 5
Roles 4 and 8
Roles 5 and 8

Rena and Sara cannot play roles that require them to be on stage together at the same time.

18. Each of the following pairs of roles could be played by the same actor EXCEPT

(A) roles 1 and 2
(B) roles 3 and 6
(C) roles 3 and 7
(D) roles 4 and 5
(E) roles 5 and 8

19. If Kirk plays role 1, which of the following must be true?

(A) Jeff plays role 2.
(B) Jeff plays role 7.
(C) Sara plays role 4.
(D) Rena plays role 4.
(E) Rena plays role 8.

20. Which of the following is an acceptable assignment of roles 4, 5, and 6, respectively?

(A) Rena, Rena, Rena
(B) Rena, Tanya, Rena
(C) Rena, Sara, Tanya
(D) Sara, Tanya, Rena
(E) Sara, Tanya, Tanya

21. Jeff could play any of the following roles EXCEPT

(A) 1
(B) 2
(C) 3
(D) 7
(E) 8

22. Which of the following actors CANNOT play more than one role, regardless of the other role assignments?

(A) Jeff
(B) Kirk
(C) Rena
(D) Sara
(E) Tanya

---

23. In March 300 college students turned out inWashington to protest against proposed cuts in student loan funds. Another 350,000 collegians flocked to Florida's sun-drenched beaches during March for "spring break." Since the Florida sun-seekers were more numerous, they were more representative of today's students than those who protested in Washington, and therefore Congress need not heed the appeals of the protesting students.

The argument above makes which of the following assumptions?

(A) The students who vacationed in Florida did not oppose the cutting of student loan funds by Congress.
(B) The students who vacationed in Florida were not in agreement with the opinion of the majority of United States citizens about the proposed cut in loan funds.
(C) The students who protested in Washington were more seriously concerned about their education than were the students who vacationed in Florida.
(D) The students who neither protested in Washington in March nor vacationed in Florida in March are indifferent to governmental policies on education.
(E) The best way to influence congressional opinion about a political issue is to communicate with one's elected representative in Washington.

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24. Some doomsayers are warning that long-range warming or cooling trends in weather patterns will drastically reduce grain production. More optimistic reports, however, point out that, even if such drifts in average temperature do occur, we should expect little change in grain production because there is little evidence that changes in rainfall patterns will occur. Moreover, for most crops, climate-induced yield trends will be masked by both the year-to-year fluctuation of yields and by the enhancement of yields because of technological factors.

Which of the following is an assumption on which the more optimistic reports mentioned in the passage are based?

(A) Long-range changes in weather patterns cannot be accurately predicted.
(B) The growing of grain is so highly dependent on technological factors that improvements in yield are unlikely, regardless of climatic conditions.
(C) Trends in rainfall patterns are more difficult to isolate than are trends in temperature.
(D) Long-range warming or cooling trends are more damaging to grain production if they are accompanied by changes in rainfall patterns than if they are not.
(E) Long-range cooling trends are potentially more destructive to grain production than are long-range warming trends.

25. Noting that the number of crimes committed in a certain city had decreased in 1982 by 5.2 percent in comparison with 1981, the police chief of the city said, "We see here the result of the innovative police program put into effect in the city at the beginning of 1982."

Which of the following, if true, most seriously weakens the conclusion drawn by the police chief?

(A) Several cities that have recently increased spending for police programs experienced no decrease in crime in 1982, as compared with 1981.
(B) The number of crimes committed in the city is estimated, by the same method each year, from the number of crimes reported.
(C) The number of crimes committed in the suburban areas surrounding the city rose by about 5 percent in 1982 over the figure for 1981 and were nearly equal in number to those in the city in 1982.
(D) The number of crimes committed in the city in 1982 was 10 percent higher than the number committed in 1972.
(E) The size of the age-group most likely to commit crimes decreased considerably in the city in 1982, as against 1981, because of a declining birth rate.

SECTION 2

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Heavily perfumed white flowers, such as gardenias, were favorites with collectors in the eighteenth century, when ------- was valued much more highly than it is today.

   (A) scent (B) beauty (C) elegance (D) color (E) variety

2. In a most impressive demonstration, Pavarotti sailed through Verdi's "Celeste Aïda," normally a tenor's -------, with the casual enthusiasm of a folk singer performing one of his favorite -------.

   (A) pitfall. .recitals (B) glory. .chorales (C) nightmare. .ballads (D) delight. .chanteys (E) routine. .composers

3. Dependence on foreign sources of heavy metals, though -------, remains ------- for United States foreign policy.

   (A) deepening. .a challenge
   (B) diminishing. .a problem
   (C) excessive. .a dilemma
   (D) debilitating. .an embarrassment
   (E) unavoidable. .a precedent

4. Cynics believe that people who ------- compliments do so in order to be praised twice.

   (A) bask in (B) give out (C) despair of (D) gloat over (E) shrug off

5. Although nothing could be further from the truth, freight railroads have been ------- of ------- the nation's shift from oil to coal by charging exorbitant fees to transport coal.

   (A) accused. .impeding
   (B) proud. .accelerating
   (C) guilty. .delaying
   (D) conscious. .contributing to
   (E) wary. .interfering with

6. Although the revelation that one of the contestants was a friend left the judge open to charges of lack of -------, the judge remained adamant in her assertion that acquaintance did not necessarily imply -------.

   (A) prudence. .tolerance
   (B) detachment. .foreknowledge
   (C) exoneration. .impropriety
   (D) prejudice. .preference
   (E) disinterestedness. .partiality

7. Within the next decade, sophisticated telescopes now orbiting the Earth will determine whether the continents really are moving, ------- the incipient ------- among geologists about the validity of the theory of continental drift.

   (A) obviating. .consensus
   (B) forestalling. .rift
   (C) escalating. .debates
   (D) engendering. .speculation
   (E) resolving. .rumors

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. PEDIATRICS : CHILDREN ::
   (A) dermatology : skin
   (B) pathology : medicine
   (C) meteorology : forecasts
   (D) neurology : psychologists
   (E) ecology : environmentalists

9. CREASE : FOLDING :: (A) serration : braiding
   (B) hole : perforating (C) dent : weakening
   (D) break : setting (E) gouge : cracking

10. DAGGER : SCABBARD ::
   (A) bow : quiver
   (B) pistol : holster
   (C) lasso : saddle
   (D) rifle : sight
   (E) spear : shaft

11. SUBPOENA : WITNESS ::
   (A) suborn : judge
   (B) tax : worker
   (C) elect : officer
   (D) conscript : soldier
   (E) hire : laborer

12. LUBRICATE : ABRASION ::
   (A) burnish : decomposition
   (B) vent : distillation
   (C) tamp : adhesion
   (D) seal : leakage
   (E) irrigate : drainage

13. ASTROLOGY : ASTRONOMY ::
   (A) alchemy : chemistry
   (B) homeopathy : zoology
   (C) mythology : classics
   (D) pedagogy : philosophy
   (E) phenomenology : linguistics

14. MALAPROPISM : VERBAL ::
   (A) heresy : moral (B) hoax : cognitive
   (C) gaffe : social (D) feint : martial
   (E) perjury : legislative

15. PLUCK : QUIT :: (A) verve : flinch
   (B) gall : skimp (C) pride : grovel
   (D) charm : smile (E) poise : waver

16. PARENTHESIS : EXPLANATION ::
   (A) synopsis : affectation
   (B) apostrophe : annotation
   (C) synthesis : interpolation
   (D) ellipsis : omission
   (E) asterisk : exaggeration

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Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

The use of heat pumps has been held back largely by skepticism about advertisers' claims that heat pumps can provide as many as two units of thermal energy for each unit of electrical energy used, thus apparently contradicting the principle of energy conservation.

Heat pumps circulate a fluid refrigerant that cycles alternatively from its liquid phase to its vapor phase in a closed loop. The refrigerant, starting as a low-temperature, low-pressure vapor, enters a compressor driven by an electric motor. The refrigerant leaves the compressor as a hot, dense vapor and flows through a heat exchanger called the condenser, which transfers heat from the refrigerant to a body of air. Now the refrigerant, as a high-pressure, cooled liquid, confronts a flow restriction which causes the pressure to drop. As the pressure falls, the refrigerant expands and partially vaporizes, becoming chilled. It then passes through a second heat exchanger, the evaporator, which transfers heat from the air to the refrigerant, reducing the temperature of this second body of air. Of the two heat exchangers, one is located inside, and the other one outside the house, so each is in contact with a different body of air: room air and outside air, respectively.

The flow direction of refrigerant through a heat pump is controlled by valves. When the refrigerant flow is reversed, the heat exchangers switch function. This flow-reversal capability allows heat pumps either to heat or cool room air.

Now, if under certain conditions a heat pump puts out more thermal energy than it consumes in electrical energy, has the law of energy conservation been challenged? No, not even remotely: the additional input of thermal energy into the circulating refrigerant via the evaporator accounts for the difference in the energy equation.

Unfortunately, there is one real problem. The heating capacity of a heat pump decreases as the outdoor temperature falls. The drop in capacity is caused by the lessening amount of refrigerant mass moved through the compressor at one time. The heating capacity is proportional to this mass flow rate: the less the mass of refrigerant being compressed, the less the thermal load it can transfer through the heat-pump cycle. The volume flow rate of refrigerant vapor through the single-speed rotary compressor used in heat pumps is approximately constant. But cold refrigerant vapor entering a compressor is at lower pressure than warmer vapor. Therefore, the mass of cold refrigerant—and thus the thermal energy it carries—is less than if the refrigerant vapor were warmer before compression.

Here, then, lies a genuine drawback of heat pumps: in extremely cold climates—where the most heat is needed—heat pumps are least able to supply enough heat.

17. The primary purpose of the passage is to

(A) explain the differences in the working of a heat pump when the outdoor temperature changes
(B) contrast the heating and the cooling modes of heat pumps
(C) describe heat pumps, their use, and factors affecting their use
(D) advocate the more widespread use of heat pumps
(E) expose extravagant claims about heat pumps as false

18. The author resolves the question of whether heat pumps run counter to the principle of energy conservation by

(A) carefully qualifying the meaning of that principle
(B) pointing out a factual error in the statement that gives rise to this question
(C) supplying additional relevant facts
(D) denying the relevance of that principle to heat pumps
(E) explaining that heat pumps can cool, as well as heat, room air

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19. It can be inferred from the passage that, in the course of a heating season, the heating capacity of a heat pump is greatest when

(A) heating is least essential
(B) electricity rates are lowest
(C) its compressor runs the fastest
(D) outdoor temperatures hold steady
(E) the heating demand surges

20. If the author's assessment of the use of heat pumps (lines 1-6) is correct, which of the following best expresses the lesson that advertisers should learn from this case?

(A) Do not make exaggerated claims about the products you are trying to promote.
(B) Focus your advertising campaign on vague analogies and veiled implications instead of on facts.
(C) Do not use facts in your advertising that will strain the prospective client's ability to believe.
(D) Do not assume in your advertising that the prospective clients know even the most elementary scientific principles.
(E) Concentrate your advertising firmly on financially relevant issues such as price discounts and efficiency of operation.

21. The passage suggests that heat pumps would be used more widely if

(A) they could also be used as air conditioners
(B) they could be moved around to supply heat where it is most needed
(C) their heat output could be thermostatically controlled
(D) models with truly superior cooling capacity were advertised more effectively
(E) people appreciated the role of the evaporator in the energy equation

22. According to the passage, the role of the flow restriction (lines 16-17) in a heat pump is to

(A) measure accurately the flow rate of the refrigerant mass at that point
(B) compress and heat the refrigerant vapor
(C) bring about the evaporation and cooling of refrigerant
(D) exchange heat between the refrigerant and the air at that point
(E) reverse the direction of refrigerant flow when needed

23. The author regards the notion that heat pumps have a genuine drawback as a

(A) cause for regret
(B) sign of premature defeatism
(C) welcome challenge
(D) case of sloppy thinking
(E) focus for an educational campaign

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All of Françoise Duparc's surviving paintings blend portraiture and genre. Her subjects appear to be acquaintances whom she has asked to pose; she has captured both their self-consciousness and the spontaneity of their everyday activities, the depiction of which characterizes genre painting. But genre painting, especially when it portrayed members of the humblest classes, was never popular in eighteenth-century France. The Le Nain brothers and Georges de La Tour, who also chose such themes, were largely ignored. Their present high standing is due to a different, more democratic political climate and to different aesthetic values: we no longer require artists to provide ideal images of humanity for our moral edification but rather regard such idealization as a falsification of the truth. Duparc gives no improving message and discreetly refrains from judging her subjects. In brief, her works neither elevate nor instruct. This restraint largely explains her lack of popular success during her lifetime, even if her talent did not go completely unrecognized by her eighteenth-century French contemporaries.

24. According to the passage, modern viewers are not likely to value which of the following qualities in a painting?

(A) The technical elements of the painting
(B) The spontaneity of the painting
(C) The moral lesson imparted by the painting
(D) The degree to which the painting realistically depicts its subject
(E) The degree to which the artist's personality is revealed in the painting

25. If the history of Duparc's artistic reputation were to follow that of the Le Nain brothers and Georges de La Tour, present-day assessments of her work would be likely to contain which of the following?

(A) An evaluation that accords high status to her work
(B) Acknowledgement of her technical expertise but dismissal of her subject matter as trivial
(C) Agreement with assessments made in her own time but acknowledgements of the exceptional quality of a few of her paintings
(D) Placement of her among the foremost artists of her century
(E) A reclassification of her work as portraiture rather than genre painting

26. It can be inferred from the passage that the term "genre painting" would most likely apply to which of the following?

(A) A painting depicting a glorious moment of victory following a battle
(B) A painting illustrating a narrative from the Bible
(C) A portrayal of a mythological Greek goddess
(D) A portrayal of a servant engaged in his work
(E) A formal portrait of an eighteenth-century king

27. The argument of the passage best supports which of the following contentions concerning judgments of artistic work?

(A) Aesthetic judgments can be influenced by the political beliefs of those making the judgment.
(B) Judgments of the value of an artist's work made by his or her contemporaries must be discounted before a true judgment can be made.
(C) Modern aesthetic taste is once again moving in the direction of regarding idealistic painting as the most desirable form of painting.
(D) In order to be highly regarded, an artist cannot be solely identified with one particular kind of painting.
(E) Spontaneity is the most valuable quality a portrait painter can have.

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Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. TURBULENCE: (A) moderation (B) tranquillity (C) immunity (D) correlation (E) meditation

29. DEHYDRATE:
(A) make soluble
(B) separate electrolytically
(C) combine with oxygen
(D) saturate with water
(E) expose to hydrogen

30. LOLL: (A) comply readily (B) move vigorously (C) describe exactly (D) notice incidentally (E) insist strongly

31. INTREPID: (A) morbid (B) forbearing (C) temperate (D) apprehensive (E) abundant

32. PRECURSORY: (A) derivative (B) ephemeral (C) original (D) essential (E) solid

33. PERENNIAL: (A) predictable (B) latent (C) engrossing (D) infertile (E) fleeting

34. DISPARATE: (A) homogeneous (B) cumulative (C) invariable (D) cooperative (E) cogent

35. FULMINATION: (A) repetition (B) addition (C) ratification (D) praise (E) escape

36. EBULLIENCE: (A) confusion (B) pretension (C) introspection (D) absentmindedness (E) impassiveness

37. PREDILECTION: (A) unwillingness to choose (B) desire to please (C) ambiguity (D) stereotype (E) propensity to dislike

38. BANAL: (A) faithful (B) arresting (C) inclined (D) forced (E) elaborate

SECTION 3

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

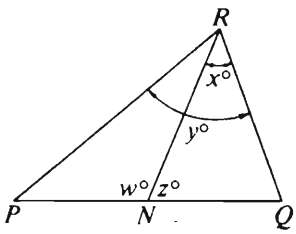
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

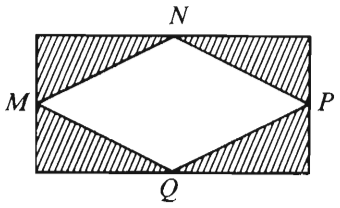


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Column A	Column B
A man left $\frac{1}{3}$ of his estate to his widow and designated that the remainder be divided equally among his 4 sons.	
1. The fraction of the estate designated for each son	$\frac{1}{12}$



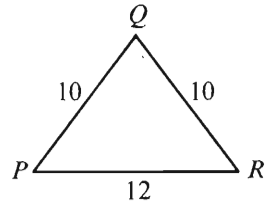
M, N, P, and Q are midpoints of the sides of the rectangle.

2.	The sum of the areas of the shaded regions	The area of the unshaded region $MNPQ$
3.	$\sqrt{38{,}205}$	200

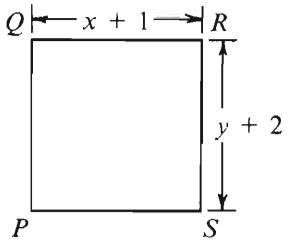
a, b, and c are negative integers.

4.	abc	$a(b + c)$

Column A	Column B



5.	The altitude of $\triangle PQR$ from Q	6



$PQRS$ is a square.

6.	x	y

$x > 1$

7.	$(x + 5)(2x + 3)$	$(x + 3)(2x + 5)$

$x > 0$

8.	$\frac{x}{14}$	$\frac{14}{x}$

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	The largest circular tabletop that can be cut from a certain square piece of wood has a circumference of 105π inches.	
9.	The length of a side of the piece of wood before the tabletop is cut from it	105π inches

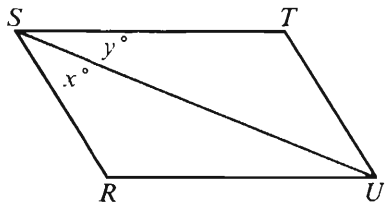
	Column A	Column B
	$10^{20} = \frac{10^{100}}{10^n}$	
10.	n	5

	Column A	Column B
	Maria's weekly net salary of \$585 is 65 percent of her weekly gross salary.	
11.	Maria's weekly gross salary	\$900

	Column A	Column B
12.	The number of different positive divisors of 12	The number of different positive divisors of 50

	Column A	Column B
	$x - y \neq 0$	
13.	$\frac{3x^2 - 3y^2}{x - y}$	$3(x - y)$

	Column A	Column B
	$3 \times 3 \times n = 2 \times 2 \times p$ $np \neq 0$	
14.	$\frac{n}{p}$	$\frac{2}{3}$

	Column A	Column B
	 $RSTU$ is a parallelogram.	
15.	x	y

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. If $8x - 3y = 24$ and $y = 0$, then $x =$

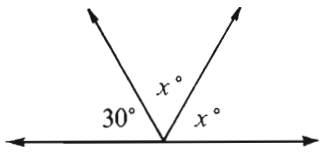
(A) 3 (B) 4 (C) 5 (D) 6 (E) 8

17. If the sum of 3, 7, and x is 18, then the average (arithmetic mean) of 3, 7, and x is

(A) 6 (B) 7 (C) 8 (D) 9 (E) 10

18. If $n = 3$, what is the value of $2^{2n} + 1$?

(A) 9 (B) 13 (C) 17 (D) 33 (E) 65



19. In the figure above, $x =$

(A) 30 (B) 35 (C) 60 (D) 75 (E) 150

20. Three individuals contributed \$800 each toward the purchase of a computer. If they bought the computer on sale for \$1,950 plus 10 percent sales tax, how much money should be refunded to each individual?

(A) \$65
(B) \$85
(C) \$150
(D) \$195
(E) \$255

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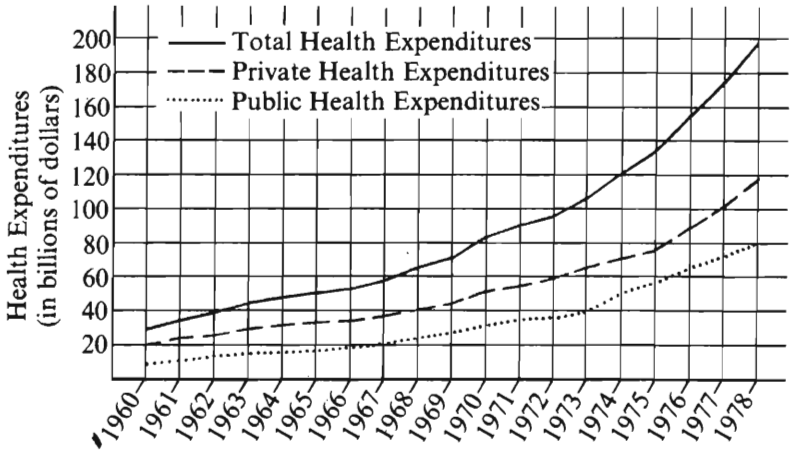
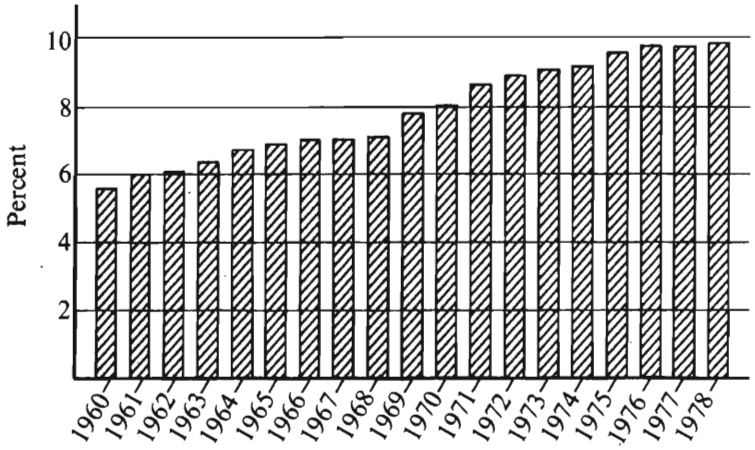
Questions 21-25 refer to the following graphs.

NATIONAL HEALTH EXPENDITURES: 1960 TO 1978



Note: Drawn to scale.

TOTAL NATIONAL HEALTH EXPENDITURES AS A PERCENT OF GROSS NATIONAL PRODUCT



Note: Drawn to scale.

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21. In 1969 approximately what was the amount of private health expenditures?

(A) \$25 billion (B) \$30 billion (C) \$45 billion
(D) \$50 billion (E) \$70 billion

22. For the years shown, what was the first year in which the amount of public health expenditures was at least \$30 billion?

(A) 1960
(B) 1962
(C) 1964
(D) 1968
(E) 1970

23. In 1976 approximately what was the ratio of the amount of private health expenditures to the amount of public health expenditures?

(A) 3:1
(B) 2:1
(C) 3:2
(D) 2:3
(E) 1:3

24. For the year in which public health expenditures were closest to \$40 billion, total health expenditures were approximately what percent of the gross national product?

(A) 10%
(B) 9%
(C) 8%
(D) 7%
(E) 6%

25. Approximately what was the amount of the gross national product in 1968 ?

(A) \$600 billion
(B) \$750 billion
(C) \$800 billion
(D) \$950 billion
(E) It cannot be determined from the information given.

GO ON TO THE NEXT PAGE.

26. If x and y are integers and $x > y > 0$, how many integers are there between, but not including, x and y?

(A) $x - y$
(B) $x + y$
(C) $x - y - 1$
(D) $x + y - 1$
(E) $x - y + 1$

27. For which of the following expressions would the value be less if 350 were replaced by 347?

I. $2{,}500 - 350$

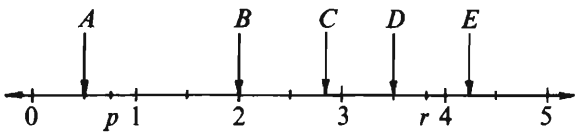
II. $\frac{1}{350}$

III. $\frac{1}{1 + \frac{1}{350}}$

(A) None (B) II only (C) III only
(D) I and III (E) II and III

28. If the circumference of circle P is 15.714 and the circumference of circle Q is 6.28, then the diameter of circle P minus the diameter of circle Q is approximately equal to

(A) 1.5
(B) 3.0
(C) 5.5
(D) 9.0
(E) 9.4



Note: Figure drawn to scale.

29. According to the number line above, which of the following points has a coordinate most nearly equal to $p \times r$?

(A) A (B) B (C) C (D) D (E) E

30. A rectangular rug covers half of a rectangular floor that is 9 feet wide and 12 feet long. If the dimensions of the rug are in the same ratio as those of the floor, how many feet long is the rug?

(A) 6
(B) $\frac{21}{2}$
(C) $2\sqrt{7}$
(D) $6\sqrt{2}$
(E) $4\sqrt{6}$

SECTION 4

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. The commission criticized the legislature for making college attendance dependent on the ability to pay, charging that, as a result, hundreds of qualified young people would be ------- further education.

   (A) entitled to (B) striving for (C) deprived of (D) uninterested in (E) participating in

2. In most Native American cultures, an article used in prayer or ritual is made with extraordinary attention to and richness of detail: it is decorated more ------- than a similar article intended for ------- use.

   (A) delicately. .vocational
   (B) colorfully. .festive
   (C) creatively. .religious
   (D) subtly. .commercial
   (E) lavishly. .everyday

3. Having no sense of moral obligation, Shipler was as little subject to the ------- of conscience after he acted as he was motivated by its ------- before he acted.

   (A) rewards. .chastisement
   (B) balm. .eloquence
   (C) reproaches. .promptings
   (D) ridicule. .allure
   (E) qualms. .atonement

4. Freud derived psychoanalytic knowledge of childhood indirectly: he ------- childhood processes from adult -------.

   (A) reconstructed. .memory
   (B) condoned. .experience
   (C) incorporated. .behavior
   (D) released. .monotony
   (E) inferred. .anticipation

5. While she initially suffered the fate of many pioneers—the incomprehension of her colleagues—octogenarian Nobel laureate Barbara McClintock has lived to ------- the triumph of her once ------- scientific theories.

   (A) descry. .innovative
   (B) regret. .insignificant
   (C) perpetuate. .tentative
   (D) enjoy. .authoritative
   (E) savor. .heterodox

6. Broadway audiences have become inured to ------- and so ------- to be pleased as to make their ready ovations meaningless as an indicator of the quality of the production before them.

   (A) sentimentality. .reluctant
   (B) condescension. .disinclined
   (C) histrionics. .unlikely
   (D) cleverness. .eager
   (E) mediocrity. .desperate

7. Any language is a conspiracy against experience in the sense that it is a collective attempt to ------- experience by reducing it into discrete parcels.

   (A) extrapolate (B) transcribe (C) complicate (D) amplify (E) manage

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. CENSUS : POPULATION :: (A) itinerary : journeys (B) inventory : merchandise (C) roster : audience (D) slate : incumbents (E) manifest : debts

9. INEVITABLE : CHANCE ::
(A) absolute : variability (B) candid : openness (C) certain : regularity (D) relaxed : diligence (E) sincere : hesitancy

10. DART : MISSILE :: (A) skiff : boat (B) planet : star (C) page : volume (D) finger : thumb (E) car : truck

11. DECIBEL : SOUND :: (A) gallon : water (B) lumen : light (C) band : signal (D) weight : mineral (E) scale : music

12. STICKLER : APPROXIMATION ::
(A) leader : guidance
(B) connoisseur : anachronism
(C) sluggard : indolence
(D) purist : adulteration
(E) scientist : theorizing

13. SYNONYMOUS : MEANING ::
(A) interchangeable : function
(B) equivocal : interpretation
(C) coincidental : cause
(D) ambidextrous : skill
(E) bilingual : language

14. INSIPID : INVENTION ::
(A) ironic : gravity (B) realistic : originality (C) generic : artistry (D) foppish : affection (E) prosaic : imagination

15. STREAM : EDDY :: (A) trend : anomaly (B) shove : punch (C) assault : defeat (D) force : motion (E) illness : symptom

16. PIRATE : TAKE :: (A) burgle : steal (B) forge : copy (C) renege : promise (D) liberate : free (E) retreat : withdraw

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Mycorrhizal fungi infect more plants than do any other fungi and are necessary for many plants to thrive, but they have escaped widespread investigation until recently for two reasons. First, the symbiotic association is so well-balanced that the roots of host plants show no damage even when densely infected. Second, the fungi cannot as yet be cultivated in the absence of a living root. Despite these difficulties, there has been important new work that suggests that this symbiotic association can be harnessed to achieve more economical use of costly superphosphate fertilizer and to permit better exploitation of cheaper, less soluble rock phosphate. Mycorrhizal benefits are not limited to improved phosphate uptake in host plants. In legumes, mycorrhizal inoculation has increased nitrogen fixation beyond levels achieved by adding phosphate fertilizer alone. Certain symbiotic associations also increase the host plant's resistance to harmful root fungi. Whether this resistance results from exclusion of harmful fungi through competition for sites, from metabolic change involving antibiotic production, or from increased vigor is undetermined.

17. Which of the following most accurately describes the passage?

    (A) A description of a replicable experiment
    (B) A summary report of new findings
    (C) A recommendation for abandoning a difficult area of research
    (D) A refutation of an earlier hypothesis
    (E) A confirmation of earlier research

18. The level of information in the passage above is suited to the needs of all of the following people EXCEPT

    (A) a researcher whose job is to identify potentially profitable areas for research and product development
    (B) a state official whose position requires her to alert farmers about possible innovations in farming
    (C) an official of a research foundation who identifies research projects for potential funding
    (D) a biologist attempting to keep up with scientific developments in an area outside of his immediate area of specialization
    (E) a botanist conducting experiments to determine the relationship between degree of mycorrhizal infection and expected uptake of phosphate

19. It can be inferred from the passage that which of the following has been a factor influencing the extent to which research on mycorrhizal fungi has progressed?

    (A) Lack of funding for such research
    (B) Lack of immediate application of such research
    (C) Lack of a method for identifying mycorrhizal fungi
    (D) Difficulties surrounding laboratory production of specimens for study
    (E) Difficulties ensuing from the high cost and scarcity of superphosphate fertilizers

20. The passage suggests which of the following about the increased resistance to harmful root fungi that some plants infected with mycorrhizal fungi seem to exhibit?

    (A) There are at least three hypotheses that might account for the increase.
    (B) An explanation lies in the fact that mycorrhizal fungi increase more rapidly in number than harmful root fungi do.
    (C) The plants that show increased resistance also exhibit improved nitrogen fixation.
    (D) Such increases may be independent of mycorrhizal infection.
    (E) It is unlikely that a satisfactory explanation can be found to account for the increase.

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In the early 1950's, historians who studied preindustrial Europe (which we may define here as Europe in the period from roughly 1300 to 1800) began, for the first time in large numbers, to investigate more of the preindustrial European population than the 2 or 3 percent who comprised the political and social elite: the kings, generals, judges, nobles, bishops, and local magnates who had hitherto usually filled history books. One difficulty, however, was that few of the remaining 97 percent recorded their thoughts or had them chronicled by contemporaries. Faced with this situation, many historians based their investigations on the only records that seemed to exist: birth, marriage, and death records. As a result, much of the early work on the nonelite was aridly statistical in nature; reducing the vast majority of the population to a set of numbers was hardly more enlightening than ignoring them altogether. Historians still did not know what these people thought or felt.

One way out of this dilemma was to turn to the records of legal courts, for here the voices of the nonelite can most often be heard, as witnesses, plaintiffs, and defendants. These documents have acted as "a point of entry into the mental world of the poor." Historians such as Le Roy Ladurie have used the documents to extract case histories, which have illuminated the attitudes of different social groups (these attitudes include, but are not confined to, attitudes toward crime and the law) and have revealed how the authorities administered justice. It has been societies that have had a developed police system and practiced Roman law, with its written depositions, whose court records have yielded the most data to historians. In Anglo-Saxon countries hardly any of these benefits obtain, but it has still been possible to glean information from the study of legal documents.

The extraction of case histories is not, however, the only use to which court records may be put. Historians who study preindustrial Europe have used the records to establish a series of categories of crime and to quantify indictments that were issued over a given number of years. This use of the records does yield some information about the nonelite, but this information gives us little insight into the mental lives of the nonelite. We also know that the number of indictments in preindustrial Europe bears little relation to the number of actual criminal acts, and we strongly suspect that the relationship has varied widely over time. In addition, aggregate population estimates are very shaky, which makes it difficult for historians to compare rates of crime per thousand in one decade of the preindustrial period with rates in another decade. Given these inadequacies, it is clear why the case history use of court records is to be preferred.

21. The author suggests that, before the early 1950's, most historians who studied preindustrial Europe did which of the following?

(A) Failed to make distinctions among members of the preindustrial European political and social elite.
(B) Used investigatory methods that were almost exclusively statistical in nature.
(C) Inaccurately estimated the influence of the preindustrial European political and social elite.
(D) Confined their work to a narrow range of the preindustrial European population.
(E) Tended to rely heavily on birth, marriage, and death records.

22. According to the passage, the case histories extracted by historians have

(A) scarcely illuminated the attitudes of the political and social elite
(B) indicated the manner in which those in power apportioned justice
(C) focused almost entirely on the thoughts and feelings of different social groups toward crime and the law
(D) been considered the first kind of historical writing that utilized the records of legal courts
(E) been based for the most part on the trial testimony of police and other legal authorities

23. It can be inferred from the passage that much of the early work by historians on the European nonelite of the preindustrial period might have been more illuminating if these historians had

(A) used different methods of statistical analysis to investigate the nonelite
(B) been more successful in identifying the attitudes of civil authorities, especially those who administered justice, toward the nonelite
(C) been able to draw on more accounts, written by contemporaries of the nonelite, that described what this nonelite thought
(D) relied more heavily on the personal records left by members of the European political and social elite who lived during the period in question
(E) been more willing to base their research on the birth, marriage, and death records of the nonelite

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24. The author mentions Le Roy Ladurie (line 26) in order to

(A) give an example of a historian who has made one kind of use of court records
(B) cite a historian who has based case histories on the birth, marriage, and death records of the nonelite
(C) identify the author of the quotation cited in the previous sentence
(D) gain authoritative support for the view that the case history approach is the most fruitful approach to court records
(E) point out the first historian to realize the value of court records in illuminating the beliefs and values of the nonelite

25. According to the passage, which of the following is true of indictments for crime in Europe in the pre-industrial period?

(A) They have, in terms of their numbers, remained relatively constant over time.
(B) They give the historian important information about the mental lives of those indicted.
(C) They are not a particularly accurate indication of the extent of actual criminal activity.
(D) Their importance to historians of the nonelite has been generally overestimated.
(E) Their problematic relationship to actual crime has not been acknowledged by most historians.

26. It can be inferred from the passage that a historian who wished to compare crime rates per thousand in a European city in one decade of the fifteenth century with crime rates in another decade of that century would probably be most aided by better information about which of the following?

(A) The causes of unrest in the city during the two decades
(B) The aggregate number of indictments in the city nearest to the city under investigation during the two decades
(C) The number of people who lived in the city during each of the decades under investigation
(D) The mental attitudes of criminals in the city, including their feelings about authority, during each of the decades under investigation
(E) The possibilities for a member of the city's nonelite to become a member of the political and social elite during the two decades

27. The passage would be most likely to appear as part of

(A) a book review summarizing the achievements of historians of the European aristocracy
(B) an essay describing trends in the practice of writing history
(C) a textbook on the application of statistical methods in the social sciences
(D) a report to the historical profession on the work of early-twentieth-century historians
(E) an article urging the adoption of historical methods by the legal profession

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Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. DOMINATE :
(A) have no ability to
(B) have no control over
(C) be irreconcilable
(D) be angry
(E) be undisciplined

29. SIDESTEP :
(A) confront directly
(B) detain temporarily
(C) comprehend accurately
(D) judge hastily
(E) treat fairly

30. FACILITATE: (A) hallow (B) hamper (C) hurdle (D) hide (E) hold

31. MUNDANE: (A) sufficient (B) superior (C) exotic (D) agile (E) perfect

32. ELASTICITY: (A) lack of spontaneity (B) lack of tension (C) lack of resilience (D) symmetry (E) permanence

33. APPRISE: (A) oblige (B) underrate (C) apply pressure (D) offer encouragement (E) withhold information

34. SQUALID: (A) florid (B) extraneous (C) fervid (D) abundant (E) pristine

35. MANIPULATIVE: (A) impassioned (B) lethargic (C) inept (D) guileless (E) unaltered

36. ANTIPATHY :
(A) pronounced talent
(B) settled fondness
(C) concealed passion
(D) cultivated nostalgia
(E) sustained interest

37. FLEDGE: (A) seek (B) call (C) mate (D) emit (E) molt

38. DIATRIBE: (A) encomium (B) epitome (C) euphemism (D) epistle (E) epigram

SECTION 5
Time—30 minutes
25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-7

Two male singers, P and S; two female singers, R and V; two male comedians, T and W; and two female comedians, Q and U, are the eight entertainers who are to perform at the Stuart Theater on a certain night. Each entertainer is to perform alone and only once that night. The entertainers may perform in any order that conforms to the following restrictions:

The performances by singers and the performances by comedians must alternate throughout the evening.
The first performance that evening must be by a female entertainer, and the second performance by a male entertainer.
The final performance must be by a male singer.

1. Which of the following could be the last of the entertainers to perform?

(A) R
(B) S
(C) T
(D) V
(E) W

2. Which of the following could be the first of the entertainers to perform?

(A) P
(B) R
(C) U
(D) V
(E) W

3. If R is to perform fourth, which of the following must perform sixth?

(A) P
(B) S
(C) U
(D) V
(E) W

4. If U is to perform seventh, which of the following must perform first?

(A) Q
(B) R
(C) S
(D) T
(E) V

5. If P is to perform eighth, which of the following must perform second?

(A) R
(B) S
(C) T
(D) V
(E) W

6. If T is to perform third, W must perform

(A) first or fifth
(B) second or fifth
(C) fourth or seventh
(D) fifth or seventh
(E) sixth or seventh

7. If Q is to perform third, V fourth, and W fifth, which of the following must perform sixth?

(A) P
(B) R
(C) S
(D) T
(E) U

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8. A child watching television experiences a procession of sights and sounds that flash from the screen just long enough for the eyes and ears to take them in. Unlike the pages of a book, which can be read as slowly or as quickly as the child wishes, television images appear with a relentless velocity that stunts rather than enhances the child's powers of imagination.

   The view expressed above is based on an assumption. Of the following, which can best serve as that assumption?

   (A) When allowed to choose a form of entertainment, children will prefer reading to watching television.
   (B) A child's imagination cannot be properly stimulated unless the child has access both to television and to books.
   (C) A child's imagination can develop more fully when the child is able to control the pace of its entertainment.
   (D) Children should be taught to read as soon as they are able to understand what they see on television.
   (E) A child's reaction to different forms of sensory stimuli cannot be predicted, since every child is different.

9. Luis has just seen two ravens; therefore, the next bird Luis sees will be a raven.

   Which of the following, if true, most strengthens the argument above?

   (A) Ravens tend to move in flocks.
   (B) Ravens generally build their nests at a considerable distance from the nests of other ravens.
   (C) Luis is in California, and ravens are occasionally seen in California.
   (D) Luis has seen ravens in other places than the place where he is now.
   (E) Luis is actively looking for birds.

10. It is true that increasing demand for a limited number of products drives up the price of those products. However, if we cut tax rates, then people will retain a higher percentage of their income and will be encouraged to work harder and produce more. Therefore, the increase in demand resulting from greater disposable income will not result in higher prices for the products available.

    In the passage above, the author makes which of the following arguments?

    (A) Reducing taxes is likely to result in less disposable income.
    (B) Reducing taxes is likely to decrease demand.
    (C) Reducing taxes can fail to result in greater disposable income.
    (D) Reducing taxes will probably restrict the availability of certain products.
    (E) Reducing taxes will not necessarily lead to increased prices.

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Questions 11-13

A chemist has exactly four unlabeled bottles containing colorless liquids standing on a laboratory shelf. The chemist knows that the only six liquids that the bottles could possibly contain are pure X, pure Y, pure Z, or any mixture of two of these, and that no two bottles are filled with the same liquid. The only feasible way of testing for the identity of the liquids is to use strips of a special white reactive paper that turns red, blue, or yellow, depending on which of certain liquids it is dipped in. The full table of color changes and of the triggers for those changes is given below:

Red	Blue	Yellow
Pure Y	Pure X	X mixed with Y
Y mixed with Z	Pure Z	X mixed with Z
	X, Y, and Z mixed together	

11. If none of the four liquids turns the reactive paper yellow, each of the following must be the contents of one of the bottles EXCEPT

    (A) pure X
    (B) pure Y
    (C) pure Z
    (D) Y mixed with Z
    (E) X, Y, and Z mixed together

12. If the liquid in the first bottle tested turns the reactive paper red, and if the liquid in the second bottle tested turns the paper yellow, then a mix of some of the liquid from each of the first two bottles tested will turn the reactive paper

    (A) red
    (B) yellow
    (C) either red or blue
    (D) either red or yellow
    (E) either blue or yellow

13. If the liquid in the first bottle tested turns the reactive paper red and the liquid in the second bottle tested turns it blue, and if a mix of some of the liquid from each of the first two bottles tested turns it red, then which of the following must be true?

    (A) The first bottle tested contains pure Y.
    (B) The first bottle tested contains Y mixed with Z.
    (C) The second bottle tested contains pure X.
    (D) The second bottle tested contains pure Z.
    (E) The second bottle tested contains Y mixed with Z.

GO ON TO THE NEXT PAGE.

Questions 14-18

A fabric designer is selecting colors for a striped pattern with a wide stripe, then a medium-width stripe, then three narrow stripes. Immediately after the narrow stripes, the pattern repeats, with the same colors as before.

The colors from among which the designer will choose are as follows.

Light colors: lavender and white
Intermediate colors: red and orange
Dark colors: brown and green

Adjacent stripes in the fabric must be of different colors from each other. Adjacent stripes in the fabric must also be of different levels of darkness (light, intermediate, or dark) from each other, except that the medium-width stripe and the narrow stripe adjacent to it can be of the same level as each other.

14. Which of the following, beginning with the wide stripe, is an order of colors that the designer can select?

(A) Lavender, white, red, brown, orange
(B) White, red, orange, brown, green
(C) Red, lavender, white, orange, brown
(D) Orange, green, white, red, orange
(E) Brown, white, brown, white, lavender

15. Which of the following is true if both lavender and white are used for the pattern?

(A) The two colors must each be used for a narrow stripe.
(B) The two colors must be used, in either order, for the medium-width stripe and the narrow stripe adjacent to it.
(C) If lavender is used for the middle of the three narrow stripes, white must be used for the medium-width stripe.
(D) If white is used for any of the narrow stripes, lavender must be used for the wide stripe and can be used for another one of the remaining stripes as well.
(E) If lavender is used for the wide stripe, white must be used for the narrow stripe adjacent to the medium-width stripe or for the middle of the three narrow stripes.

16. Which of the following, beginning with the wide stripe, is an order of colors that the designer can select?

(A) Green, white, lavender, brown, orange
(B) Lavender, green, brown, orange, white
(C) Red, orange, green, brown, lavender
(D) Orange, white, green, lavender, red
(E) Brown, lavender, white, orange, green

17. If green is used for the middle of the three narrow stripes and for one other stripe, and red and orange are the only other colors used, which of the following is true?

(A) The medium-width stripe must be green.
(B) The medium-width stripe can be green, but if it is, the two remaining narrow stripes must be the same color as each other.
(C) The wide stripe must be green.
(D) The wide stripe can be green, but if it is, the two remaining narrow stripes must be the same color as each other.
(E) The wide stripe can be green, but if it is, the two remaining narrow stripes must be of different colors from each other.

18. If at least two of the stripes will be red and at least two others will be white, which of the following is true?

(A) Lavender cannot be used for the wide stripe.
(B) Brown cannot be used for the medium-width stripe.
(C) Green cannot be used for the narrow stripe adjacent to the medium-width stripe.
(D) Orange can be used for the middle of the three narrow stripes.
(E) Lavender can be used for the narrow stripe after which the pattern repeats.

GO ON TO THE NEXT PAGE.

Questions 19-22

F, G, and H are insurance companies, and Q, R, S, and T are private detectives. Each detective works for at least one of the insurance companies.

Q always works for F and at least one of the other companies.

Some of the time G employs only one of these detectives; the rest of the time it employs exactly two of them.

F and H each employ exactly two of these detectives all the time.

19. If R works for H only, and if S works for G and H only, T works for

(A) F only
(B) G only
(C) H only
(D) both F and G
(E) both F and H

20. If Q and R both work for the same two insurance companies, T must work for

(A) both F and G
(B) both F and H
(C) either F or G but not both
(D) either F or H but not both
(E) either G or H but not both

21. Whenever only S works for G, which of the following must be true?

(A) R works for either F or G but not both.
(B) T works for either G or H but not both.
(C) Q and R cannot work for the same company.
(D) Q and T cannot work for the same company.
(E) R and T cannot work for the same company.

22. Whenever G employs only one detective, which of the following must be true?

I. R works for two insurance companies.
II. T works for G.
III. S works for only one insurance company.

(A) I only
(B) II only
(C) III only
(D) I and II only
(E) II and III only

GO ON TO THE NEXT PAGE.

23. Nursing homes range from three to five stories in height. If a nursing-home room is above the first floor, it has a fire escape.

If the above statements are true, which of the following must also be true?

(A) First-floor rooms in nursing homes do not have fire escapes.
(B) Fire escapes are allowed but not required for first-floor rooms in nursing homes.
(C) Some nursing homes have no fire escapes.
(D) Not all nursing homes have proper fire escapes..
(E) Second-floor rooms in nursing homes have fire escapes.

24. At Midwest University, there is no collusion between the athletic office and the admissions office. Athletes must be accepted for admission to the university on the basis of their academic records before they can be offered financial assistance on the basis of athletic ability. The university thus hopes to avoid the kind of recruiting violations that have been a problem at other universities.

It can be inferred from the passage above that

(A) the admission policy described above is unique to Midwest University
(B) some universities offer financial assistance to athletes who would not be admitted to the university on the basis of their academic records
(C) most student athletes in universities are admitted solely on the basis of athletic ability
(D) admissions offices do not modify academic admission requirements for any students except student athletes
(E) in many universities, athletic offices are often at odds with admissions offices

25. Our words are meaningless and cannot be distinguished from their opposites, as can be proved by an example. People think that they know the difference between the meanings of "bald" and "having hair." Suppose an average person twenty-one years of age has N hairs on his or her head. We say that that person is not bald but has hair. But surely one hair less would make no difference, and a person with $N-1$ hairs on his or her head would be said to have hair. Suppose we kept on, with one hair less each time. The result would be the same. But what would be the difference between someone who had one hair and someone who had none? We call them both bald. Nowhere can we make a distinction between "bald" and "having hair."

Which of the following statements best counters the argument above?

(A) The word "bald" can be translated into other languages.
(B) A word can have more than one meaning.
(C) A word such as "cat" can be applied to several animals that differ in some respects.
(D) Words can lack precision without being meaningless.
(E) People cannot think clearly without using words.

SECTION 6

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

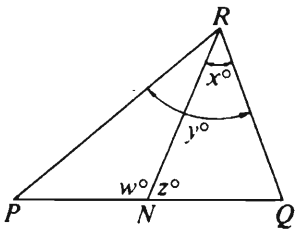
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

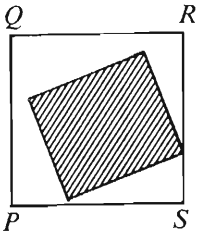
GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	$\left(\frac{2}{3}\right)^2$	$\frac{2}{3^2}$

	Column A	Column B
	There are two diving boards at a certain pool. The height of the lower board is 3 meters. The height of the higher board is 1 meter greater than twice the height of the lower board.	
2.	The height of the higher board minus the height of the lower board	4.5 meters

	Column A	Column B
	$x = 3$ $y = -1$	
3.	$y - x$	xy^2

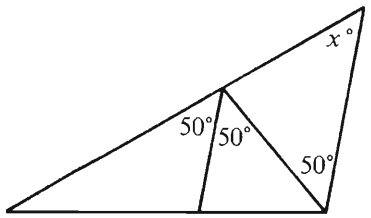


	Column A	Column B
4.	The perimeter of square $PQRS$	The perimeter of the shaded rectangular region

	Column A	Column B
5.	A number between 5 and 10	A number between 8 and 14

	Column A	Column B
6.	$\frac{3}{4} + \frac{1}{3}$	1

	Column A	Column B
	$y < z < x$ $y < w$	
7.	w	x



	Column A	Column B
8.	x	50

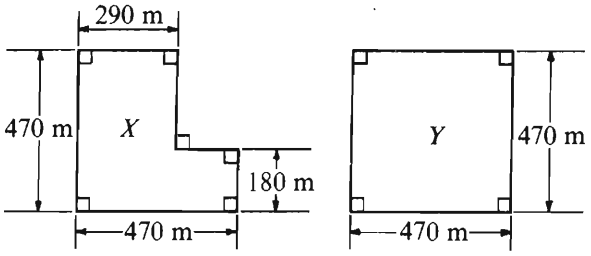
	Column A	Column B
9.	The number of minutes in 3.15 hours	The number of minutes in 3 hours 15 minutes

	Column A	Column B
	$\frac{1}{2}x = \frac{1}{3}y = \frac{1}{5}z$ $z = 30$	
10.	$x + y$	30

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Column A	Column B

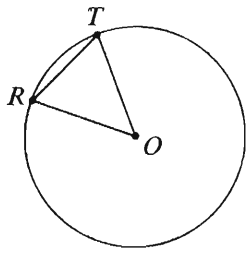


Fields X and Y are to be enclosed with fencing that costs \$24 per meter.

	Column A	Column B
11.	The cost of the fencing needed to enclose X	The cost of the fencing needed to enclose Y

$n > 0$

	Column A	Column B
12.	$\dfrac{n(n+1)+n+1}{(n+1)^2}$	1



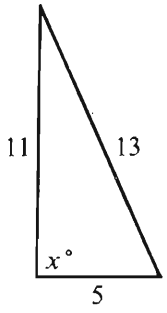
The circle has center O and $RT = 5$.

	Column A	Column B
13.	The circumference of the circle	10π

Column A	Column B

x, y, and z are positive integers, and $z > x > y$.

	Column A	Column B
14.	The remainder when z is divided by x	The remainder when z is divided by y



	Column A	Column B
15.	x	90

GO ON TO THE NEXT PAGE.

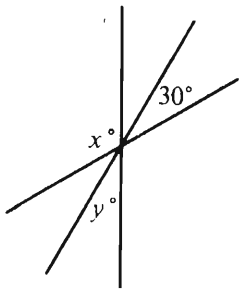
Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. A certain machine fills a bag with 7 ounces of potato chips in 3.5 seconds. At this rate how many seconds will it take the machine to fill a bag with 15 ounces of potato chips?

(A) 6.5 (B) 7.0 (C) 7.5
(D) 8.0 (E) 11.5

17. On a number line, the distance between the two points with coordinates -5 and 1 is how much less than the distance between the two points with coordinates 2 and 14?

(A) 6 (B) 8 (C) 10 (D) 12 (E) 16

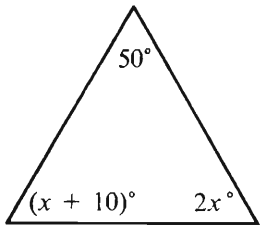


18. In the figure above, if $x = 4y$, then $y =$

(A) 30 (B) 36 (C) 37.5 (D) 40 (E) 50

19. If 45 percent of n is 405, what is 35 percent of n?

(A) 61
(B) 64
(C) 142
(D) 250
(E) 315



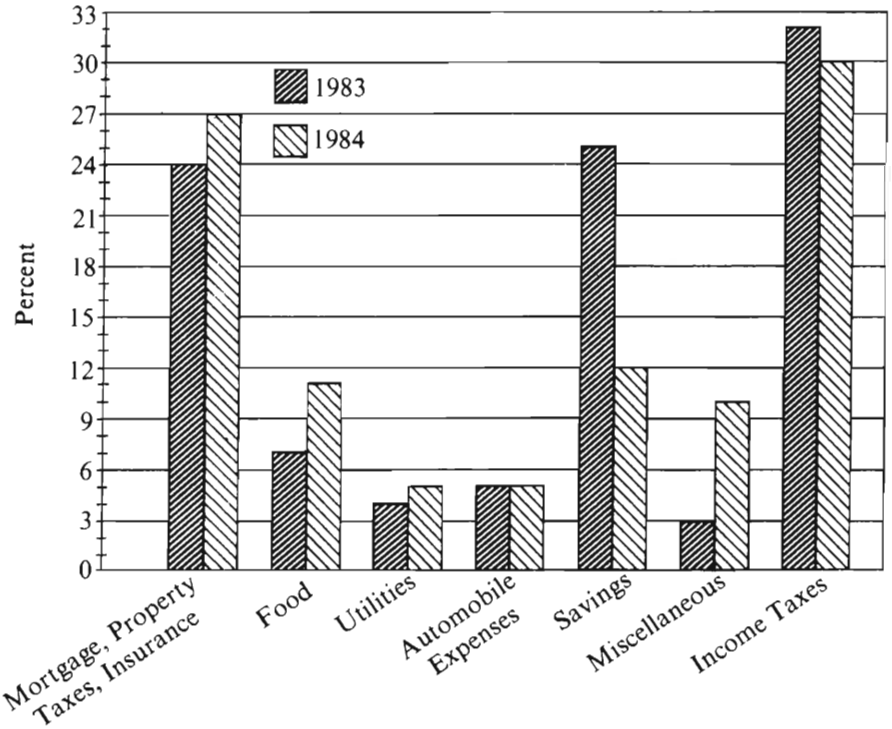
20. In the triangle above, $x =$

(A) 65 (B) 40 (C) 35 (D) 25 (E) 10

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graph.

FAMILY *X*'S EXPENDITURES AS A PERCENT OF ITS GROSS ANNUAL INCOME*



* In 1983, 100% = $50,000
In 1984, 100% = $45,000

Note: Drawn to scale.

GO ON TO THE NEXT PAGE.

21. In 1984 for how many of the seven categories listed were expenditures greater than 9 percent of Family X's gross annual income?

(A) Two (B) Three (C) Four
(D) Five (E) Six

22. In 1983 Family X used a total of 49 percent of its gross annual income for two of the categories listed. What was the total amount of Family X's income used for those same categories in 1984 ?

(A) \$16,200
(B) \$17,550
(C) \$19,500
(D) \$22,050
(E) \$24,500

23. From 1983 to 1984 the increase in Family X's miscellaneous expenses was most nearly which of the following?

(A) \$3,000
(B) \$3,150
(C) \$3,500
(D) \$4,500
(E) \$5,000

24. Family X's gross income is the sum of Mr. X's income and Mrs. X's income. In 1983 Mr. and Mrs. X each had an income of \$25,000. If Mr. X's income increased by 10 percent from 1983 to 1984, by what percent did Mrs. X's income decrease for the same period?

(A) 10%
(B) 15%
(C) 20%
(D) 25%
(E) 30%

25. By approximately what percent did the amount that Family X put into savings decrease from 1983 to 1984 ?

(A) 13%
(B) 23%
(C) 35%
(D) 45%
(E) 57%

GO ON TO THE NEXT PAGE.

26. Of the following, which is greatest?

(A) $\frac{1}{2}$ (B) $\frac{7}{15}$ (C) $\frac{49}{100}$

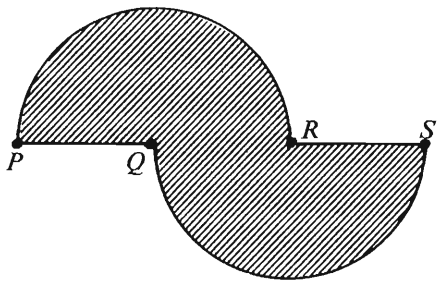
(D) $\frac{126}{250}$ (E) $\frac{1,999}{4,000}$

27. If x, y, and z are consecutive positive integers, with $x < y < z$ and $x + y + z$ an even number, which of the following could be the value of z ?

(A) 1 (B) 2 (C) 4 (D) 5 (E) 8

28. If $x^2 = 68$, which of the following could be true?

(A) $-9 < x < -8$
(B) $-8 < x < -7$
(C) $-8 < x < 8$
(D) $7 < x < 8$
(E) $9 < x < 10$



29. In the figure above, arcs PR and QS are semicircles with centers at Q and R respectively. If $PQ = 5$, what is the perimeter of the shaded region?

(A) $5\pi + 5$
(B) $5\pi + 15$
(C) $10\pi + 10$
(D) $10\pi + 15$
(E) 100π

30. If \$4,500 was invested in a bond fund when the price per share was \$9 and \$3,000 was invested in the fund when the price per share was \$10, what was the average (arithmetic mean) price per share purchased?

(A) \$9.625
(B) \$9.50
(C) \$9.40
(D) \$9.375
(E) \$9.20

FOR GENERAL TEST 5 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 2			Section 4		
Number	Answer	P+	Number	Answer	P+
1	A	89	1	C	93
2	C	75	2	E	75
3	B	76	3	C	63
4	E	69	4	A	66
5	A	75	5	E	65
6	E	41	6	E	51
7	B	10	7	E	15
8	A	83	8	B	85
9	B	70	9	A	80
10	B	71	10	A	54
11	D	56	11	B	51
12	D	67	12	D	52
13	A	61	13	A	37
14	C	38	14	E	30
15	C	29	15	A	27
16	D	29	16	B	26
17	C	73	17	B	83
18	C	55	18	E	35
19	A	60	19	D	65
20	C	43	20	A	57
21	E	18	21	D	61
22	C	64	22	B	39
23	A	56	23	C	66
24	C	58	24	A	59
25	A	37	25	C	73
26	D	75	26	C	50
27	A	55	27	B	50
28	B	90	28	B	93
29	D	88	29	A	92
30	B	76	30	B	80
31	D	42	31	C	74
32	A	46	32	C	57
33	E	47	33	E	53
34	A	40	34	E	35
35	D	25	35	D	42
36	E	27	36	B	29
37	E	24	37	E	23
38	B	21	38	A	21

QUANTITATIVE ABILITY					
Section 3			Section 6		
Number	Answer	P+	Number	Answer	P+
1	A	85	1	A	92
2	C	82	2	B	91
3	B	85	3	B	87
4	B	76	4	A	78
5	A	75	5	D	84
6	A	75	6	A	88
7	A	69	7	D	85
8	D	59	8	C	77
9	B	62	9	B	79
10	A	54	10	C	64
11	C	58	11	C	65
12	C	49	12	C	63
13	D	42	13	D	57
14	B	42	14	D	45
15	D	26	15	A	28
16	A	94	16	C	87
17	A	84	17	A	80
18	E	81	18	A	85
19	D	76	19	E	83
20	B	73	20	B	83
21	C	93	21	D	86
22	E	85	22	B	57
23	C	76	23	A	49
24	B	82	24	E	36
25	D	38	25	E	23
26	C	58	26	D	69
27	C	45	27	D	62
28	B	50	28	A	58
29	C	50	29	C	63
30	D	26	30	D	44

ANALYTICAL ABILITY					
Section 1			Section 5		
Number	Answer	P+	Number	Answer	P+
1	D	78	1	B	93
2	D	86	2	C	71
3	A	90	3	D	57
4	D	70	4	A	69
5	C	68	5	B	76
6	B	60	6	D	66
7	E	66	7	B	59
8	A	86	8	C	87
9	C	67	9	A	86
10	A	81	10	E	77
11	C	69	11	E	44
12	E	58	12	E	51
13	C	82	13	D	42
14	D	24	14	C	58
15	D	48	15	E	21
16	B	32	16	A	41
17	E	36	17	C	36
18	B	54	18	A	23
19	B	38	19	A	30
20	C	42	20	E	39
21	E	22	21	E	16
22	E	18	22	C	32
23	A	49	23	E	61
24	D	39	24	B	64
25	E	26	25	D	68

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 5 ONLY AND THE PERCENTS BELOW*

Raw Score	Scaled Scores and Percents Below*						Raw Score	Scaled Scores and Percents Below*					
	Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below		Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below
73-76	800	99					40	460	46	540	46	730	94
72	790	99					39	450	43	530	43	710	92
71	780	99					38	440	40	520	41	690	89
70	770	99					37	430	37	510	38	680	88
69	760	99					36	420	34	500	36	660	84
68	750	98					35	410	31	490	34	650	83
67	730	97					34	410	31	480	31	630	78
66	720	96					33	400	28	460	27	610	74
65	710	96					32	390	26	450	25	600	71
64	700	95					31	380	24	440	23	580	66
63	690	94					30	370	22	430	21	560	60
62	670	92					29	360	18	420	19	550	58
61	660	91					28	360	18	410	17	530	52
60	650	89	800	98			27	350	16	400	16	520	48
59	640	88	800	98			26	340	14	390	14	500	43
58	630	86	800	98			25	340	14	370	11	480	37
57	620	85	790	97			24	330	12	360	10	470	34
56	610	83	780	96			23	320	10	350	8	450	29
55	600	82	760	93			22	310	9	340	7	440	26
54	590	80	750	91			21	300	7	330	6	420	22
53	580	78	730	88			20	290	6	310	5	400	18
52	570	75	710	84			19	280	5	300	4	390	16
51	560	73	700	82			18	270	4	290	3	370	12
50	550	71	680	78	800	99	17	260	3	280	2	350	9
49	540	68	660	74	800	99	16	250	2	270	2	340	8
48	530	65	650	72	800	99	15	240	1	250	1	320	6
47	520	63	630	67	800	99	14	230	1	240	1	310	5
46	510	60	620	65	800	99	13	220	1	220	0	290	4
45	500	57	610	62	800	99	12	210	0	210	0	270	2
44	490	55	590	58	790	98	11	210	0	200	0	260	2
43	480	52	580	55	770	97	10	200	0	200	0	240	1
42	470	49	570	53	760	97	9	200	0	200	0	230	1
41	460	46	560	51	740	95	8	200	0	200	0	210	0
							7	200	0	200	0	200	0
							6	200	0	200	0	200	0
							0-5	200	0	200	0	200	0

*Percent scoring below the scaled score based on the performance of the 844,960 examinees who took the General Test between October 1, 1984, and September 30, 1987.

TEST 6

SECTION 1

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. By divesting himself of all regalities, the former king ------- the consideration that customarily protects monarchs.

   (A) merited (B) forfeited (C) debased (D) concealed (E) extended

2. A perennial goal in zoology is to infer function from -------, relating the ------- of an organism to its physical form and cellular organization.

   (A) age..ancestry
   (B) classification..appearance
   (C) size..movement
   (D) structure..behavior
   (E) location..habitat

3. The sociologist responded to the charge that her new theory was ------- by pointing out that it did not in fact contradict accepted sociological principles.

   (A) banal (B) heretical (C) unproven (D) complex (E) superficial

4. Industrialists seized economic power only after industry had ------- agriculture as the preeminent form of production; previously such power had ------- land ownership.

   (A) sabotaged..threatened
   (B) overtaken..produced
   (C) toppled..culminated in
   (D) joined..relied on
   (E) supplanted..resided in

5. Rumors, embroidered with detail, live on for years, neither denied nor confirmed, until they become accepted as fact even among people not known for their -------.

   (A) insight (B) obstinacy (C) introspection (D) tolerance (E) credulity

6. No longer ------- by the belief that the world around us was expressly designed for humanity, many people try to find intellectual ------- for that lost certainty in astrology and in mysticism.

   (A) satisfied..reasons
   (B) sustained..substitutes
   (C) reassured..justifications
   (D) hampered..equivalents
   (E) restricted..parallels

7. People should not be praised for their virtue if they lack the energy to be -------; in such cases, goodness is merely the effect of -------.

   (A) depraved..hesitation
   (B) cruel..effortlessness
   (C) wicked..indolence
   (D) unjust..boredom
   (E) iniquitous..impiety

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. SKELETON : ANIMAL :: (A) ivory : piano
(B) peel : fruit (C) ore : mine
(D) mast : ship (E) framing : building

9. OUTSKIRTS : TOWN ::
(A) rung : ladder
(B) trunk : tree
(C) water : goblet
(D) margin : page
(E) hangar : airplane

10. AMORPHOUSNESS : DEFINITION ::
(A) lassitude : energy
(B) spontaneity : awareness
(C) angularity : intricacy
(D) rectitude : drabness
(E) precision : uniformity

11. COLLUSION : CONSPIRATORS ::
(A) conclusion : messengers
(B) revision : correspondents
(C) identification : arbitrators
(D) attribution : interpreters
(E) cooperation : partners

12. DIVERT : SHUNT :: (A) file : collate
(B) collide : dent (C) guess : calibrate
(D) retard : brake (E) inspect : magnify

13. EQUIVOCATE : COMMITMENT ::
(A) procrastinate : action
(B) implicate : exposition
(C) expostulate : confusion
(D) corroborate : falsification
(E) fabricate : explanation

14. ARMADA : VEHICLES ::
(A) drill : recruits
(B) planning : logistics
(C) infantry : cavalry
(D) fusillade : projectiles
(E) supply : munitions

15. LACONIC : SPEECH ::
(A) believable : excuse
(B) unyielding : attitude
(C) austere : design
(D) somber : procession
(E) gradual : transition

16. GROW : BURGEON :: (A) beat : palpitate
(B) transport : enrapture (C) flourish : thrive
(D) rot : decay (E) evolve : multiply

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

The belief that art originates in intuitive rather than rational faculties was worked out historically and philosophically in the somewhat wearisome volumes of Benedetto Croce, who is usually considered the originator of a new aesthetic. Croce was, in fact, expressing a very old idea. Long before the Romantics stressed intuition and self-expression, the frenzy of inspiration was regarded as fundamental to art, but philosophers had always assumed it must be controlled by law and by the intellectual power of putting things into harmonious order. This general philosophic concept of art was supported by technical necessities. It was necessary to master certain laws and to use intellect in order to build Gothic cathedrals, or set up the stained glass windows of Chartres. When this bracing element of craftsmanship ceased to dominate artists' outlook, new technical elements had to be adopted to maintain the intellectual element in art. Such were linear perspective and anatomy.

17. The passage suggests that which of the following would most likely have occurred if linear perspective and anatomy had not come to influence artistic endeavor?
    (A) The craftsmanship that shaped Gothic architecture would have continued to dominate artists' outlooks.
    (B) Some other technical elements would have been adopted to discipline artistic inspiration.
    (C) Intellectual control over artistic inspiration would not have influenced painting as it did architecture.
    (D) The role of intuitive inspiration would not have remained fundamental to theories of artistic creation.
    (E) The assumptions of aesthetic philosophers before Croce would have been invalidated.

18. The passage supplies information for answering which of the following questions?
    (A) Does Romantic art exhibit the triumph of intuition over intellect?
    (B) Did an emphasis on linear perspective and anatomy dominate Romantic art?
    (C) Are the intellectual and intuitive faculties harmoniously balanced in post-Romantic art?
    (D) Are the effects of the rational control of artistic inspiration evident in the great works of pre-Romantic eras?
    (E) Was the artistic craftsmanship displayed in Gothic cathedrals also an element in paintings of this period?

19. The passage implies that which of the following was a traditional assumption of aesthetic philosophers?
    (A) Intellectual elements in art exert a necessary control over artistic inspiration.
    (B) Architecture has never again reached the artistic greatness of the Gothic cathedrals.
    (C) Aesthetic philosophy is determined by the technical necessities of art.
    (D) Artistic craftsmanship is more important in architectural art than in pictorial art.
    (E) Paintings lacked the intellectual element before the invention of linear perspective and anatomy.

20. The author mentions "linear perspective and anatomy" in the last sentence in order to do which of the following?
    (A) Expand his argument to include painting as well as architecture
    (B) Indicate his disagreement with Croce's theory of the origins of art
    (C) Support his point that rational order of some kind has often seemed to discipline artistic inspiration
    (D) Explain the rational elements in Gothic painting that corresponded to craftsmanship in Gothic architecture
    (E) Show the increasing sophistication of artists after the Gothic period

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(The passage below is drawn from an article published in 1962.)

Computer programmers often remark that computing machines, with a perfect lack of discrimination, will do any foolish thing they are told to do. The reason for this lies, of course, in the narrow fixation of the computing machine's "intelligence" on the details of its own perceptions—its inability to be guided by any large context. In a psychological description of the computer intelligence, three related adjectives come to mind: single-minded, literal-minded, and simpleminded. Recognizing this, we should at the same time recognize that this single-mindedness, literal-mindedness, and simplemindedness also characterizes theoretical mathematics, though to a lesser extent.

Since science tries to deal with reality, even the most precise sciences normally work with more or less imperfectly understood approximations toward which scientists must maintain an appropriate skepticism. Thus, for instance, it may come as a shock to mathematicians to learn that the Schrödinger equation for the hydrogen atom is not a literally correct description of this atom, but only an approximation to a somewhat more correct equation taking account of spin, magnetic dipole, and relativistic effects; and that this corrected equation is itself only an imperfect approximation to an infinite set of quantum field-theoretical equations. Physicists, looking at the original Schrödinger equation, learn to sense in it the presence of many invisible terms in addition to the differential terms visible, and this sense inspires an entirely appropriate disregard for the purely technical features of the equation. This very healthy skepticism is foreign to the mathematical approach.

Mathematics must deal with well-defined situations. Thus, mathematicians depend on an intellectual effort outside of mathematics for the crucial specification of the approximation that mathematics is to take literally. Give mathematicians a situation that is the least bit ill-defined, and they will make it well-defined, perhaps appropriately, but perhaps inappropriately. In some cases, the mathematicians' literal-mindedness may have unfortunate consequences. The mathematicians turn the scientists' theoretical assumptions, that is, their convenient points of analytical emphasis, into axioms, and then take these axioms literally. This brings the danger that they may also persuade the scientists to take these axioms literally. The question, central to the scientific investigation but intensely disturbing in the mathematical context—what happens if the axioms are relaxed?—is thereby ignored.

The physicist rightly dreads precise argument, since an argument that is convincing only if it is precise loses all its force if the assumptions on which it is based are slightly changed, whereas an argument that is convincing though imprecise may well be stable under small perturbations of its underlying assumptions.

21. The author discusses computing machines in the first paragraph primarily in order to do which of the following?
    (A) Indicate the dangers inherent in relying to a great extent on machines
    (B) Illustrate his views about the approach of mathematicians to problem solving
    (C) Compare the work of mathematicians with that of computer programmers
    (D) Provide one definition of intelligence
    (E) Emphasize the importance of computers in modern technological society

22. According to the passage, scientists are skeptical toward their equations because scientists
    (A) work to explain real, rather than theoretical or simplified, situations
    (B) know that well-defined problems are often the most difficult to solve
    (C) are unable to express their data in terms of multiple variables
    (D) are unwilling to relax the axioms they have developed
    (E) are unable to accept mathematical explanations of natural phenomena

23. It can be inferred from the passage that scientists make which of the following assumptions about scientific arguments?
    (A) The literal truth of the arguments can be made clear only in a mathematical context.
    (B) The arguments necessarily ignore the central question of scientific investigation.
    (C) The arguments probably will be convincing only to other scientists.
    (D) The conclusions of the arguments do not necessarily follow from their premises.
    (E) The premises on which the arguments are based may change.

GO ON TO THE NEXT PAGE.

24. According to the passage, mathematicians present a danger to scientists for which of the following reasons?

(A) Mathematicians may provide theories that are incompatible with those already developed by scientists.
(B) Mathematicians may define situations in a way that is incomprehensible to scientists.
(C) Mathematicians may convince scientists that theoretical assumptions are facts.
(D) Scientists may come to believe that axiomatic statements are untrue.
(E) Scientists may begin to provide arguments that are convincing but imprecise.

25. The author suggests that the approach of physicists to solving scientific problems is which of the following?

(A) Practical for scientific purposes
(B) Detrimental to scientific progress
(C) Unimportant in most situations
(D) Expedient, but of little long-term value
(E) Effective, but rarely recognized as such

26. The author suggests that a mathematician asked to solve a problem in an ill-defined situation would first attempt to do which of the following?

(A) Identify an analogous situation
(B) Simplify and define the situation
(C) Vary the underlying assumptions of a description of the situation
(D) Determine what use would be made of the solution provided
(E) Evaluate the theoretical assumptions that might explain the situation

27. The author implies that scientists develop a healthy skepticism because they are aware that

(A) mathematicians are better able to solve problems than are scientists
(B) changes in axiomatic propositions will inevitably undermine scientific arguments
(C) well-defined situations are necessary for the design of reliable experiments
(D) mathematical solutions can rarely be applied to real problems
(E) some factors in most situations must remain unknown

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. EVACUATE: (A) boil off (B) fill up
(C) melt down (D) neutralize (E) spin

29. OUTLANDISH: (A) prolific
(B) unchanging (C) conventional
(D) noticeable (E) transparent

30. INHIBITOR: (A) catalyst (B) acid
(C) solution (D) reaction (E) compound

31. CONSTRICT: (A) expiate (B) deviate
(C) dilate (D) accelerate (E) vindicate

32. REPORTORIAL: (A) unlikely
(B) imaginative (C) indecisive
(D) characteristic (E) challenging

33. INDIGENCE: (A) wealth (B) vanity
(C) boldness (D) endurance (E) vivacity

34. INVEIGLE:
(A) display openly (B) request directly
(C) initiate willingly (D) advocate strongly
(E) contribute lavishly

35. TRACTABLE: (A) distraught (B) irritating
(C) ruthless (D) headstrong (E) lazy

36. INCHOATE:
(A) sensuously pleasant
(B) prominently visible
(C) intrinsically reasonable
(D) fully formed
(E) widely known

37. PERFIDY: (A) thoroughness (B) generosity
(C) gratitude (D) tact (E) loyalty

38. APPROPRIATE: (A) create a void
(B) rectify an error (C) sanction
(D) surrender (E) lend

SECTION 2
Time—30 minutes
38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Animals that have tasted unpalatable plants tend to ------- them afterward on the basis of their most conspicuous features, such as their flowers.

   (A) recognize (B) hoard (C) trample (D) retrieve (E) approach

2. As for the alleged value of expert opinion, one need only ------- government records to see ------- evidence of the failure of such opinions in many fields.

   (A) inspect..questionable
   (B) retain..circumstantial
   (C) distribute..possible
   (D) consult..strong
   (E) evaluate..problematic

3. In scientific inquiry it becomes a matter of duty to expose a ------- hypothesis to every possible kind of -------.

   (A) tentative..examination
   (B) debatable..approximation
   (C) well-established..rationalization
   (D) logical..elaboration
   (E) suspect..correlation

4. Charlotte Salomon's biography is a reminder that the currents of private life, however diverted, dislodged, or twisted by ------- public events, retain their hold on the ------- recording them.

   (A) transitory..culture
   (B) dramatic..majority
   (C) overpowering..individual
   (D) conventional..audience
   (E) relentless..institution

5. Philosophical problems arise when people ask questions that, though very ------, have certain characteristics in common.

   (A) relevant
   (B) elementary
   (C) abstract
   (D) diverse
   (E) controversial

6. Although Johnson ------- great enthusiasm for his employees' project, in reality his interest in the project was so ------- as to be almost non-existent.

   (A) generated..redundant
   (B) displayed..preemptive
   (C) expected..indiscriminate
   (D) feigned..perfunctory
   (E) demanded..dispassionate

7. Not all the indicators necessary to convey the effect of depth in a picture work simultaneously; the picture's illusion of ------- three-dimensional appearance must therefore result from the viewer's integration of various indicators perceived -------.

   (A) imitative..coincidentally
   (B) uniform..successively
   (C) temporary..comprehensively
   (D) expressive..sympathetically
   (E) schematic..passively

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. GADGETS : TOOLS :: (A) blankets : linen
(B) leaflets : posters (C) trinkets : jewelry
(D) sockets : bulbs (E) ringlets : hair

9. LISTEN : RECORDING :: (A) carve : statue
(B) reproduce : plan (C) review : book
(D) frame : painting (E) view : photograph

10. CENSORSHIP : INFORMATION ::
(A) frugality : constraint
(B) sampling : measurement
(C) sanitation : disease
(D) cultivation : erosion
(E) philanthropy : generosity

11. DELUGE : DROPLET ::
(A) beach : wave
(B) desert : oasis
(C) blizzard : icicle
(D) landslide : pebble
(E) cloudburst : puddle

12. SPEAK : RETICENT ::
(A) spend : parsimonious
(B) excel : audacious
(C) commend : irate
(D) work : servile
(E) invent : diffident

13. PATRIOTIC : CHAUVINISTIC ::
(A) impudent : intolerant
(B) furtive : surreptitious
(C) incisive : trenchant
(D) receptive : gullible
(E) verbose : prolix

14. BOUQUET : FLOWERS :: (A) forest : trees
(B) husk : corn (C) mist : rain
(D) woodpile : logs (E) drift : snow

15. ENDEMIC : REGION ::
(A) homogeneous : population
(B) inborn : individual
(C) hybrid : species
(D) sporadic : time
(E) aberrant : norm

16. PECCADILLO : SIN ::
(A) provocation : instigation
(B) anxiety : fear
(C) perjury : corruption
(D) penury : poverty
(E) admonishment : castigation

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

In eighteenth-century France and England, reformers rallied around egalitarian ideals, but few reformers advocated higher education for women. Although the public decried women's lack of education, it did not encourage learning for its own sake for women. In spite of the general prejudice against learned women, there was one place where women could exhibit their erudition: the literary salon. Many writers have defined the woman's role in the salon as that of an intelligent hostess, but the salon had more than a social function for women. It was an informal university, too, where women exchanged ideas with educated persons, read their own works and heard those of others, and received and gave criticism.

In the 1750's, when salons were firmly established in France, some English women, who called themselves "Bluestockings," followed the example of the *salonnières* (French salon hostesses) and formed their own salons. Most Bluestockings did not wish to mirror the *salonnières*; they simply desired to adapt a proven formula to their own purpose—the elevation of women's status through moral and intellectual training. Differences in social orientation and background can account perhaps for differences in the nature of French and English salons. The French salon incorporated aristocratic attitudes that exalted courtly pleasure and emphasized artistic accomplishments. The English Bluestockings, originating from a more modest background, emphasized learning and work over pleasure. Accustomed to the regimented life of court circles, *salonnières* tended toward formality in their salons. The English women, though somewhat puritanical, were more casual in their approach.

At first, the Bluestockings did imitate the *salonnières* by including men in their circles. However, as they gained cohesion, the Bluestockings came to regard themselves as a women's group and to possess a sense of female solidarity lacking in the *salonnières*, who remained isolated from one another by the primacy each held in her own salon. In an atmosphere of mutual support, the Bluestockings went beyond the salon experience. They traveled, studied, worked, wrote for publication, and by their activities challenged the stereotype of the passive woman. Although the *salonnières* were aware of sexual inequality, the narrow boundaries of their world kept their intellectual pursuits within conventional limits. Many *salonnières*, in fact, camouflaged their nontraditional activities behind the role of hostess and deferred to men in public.

Though the Bluestockings were trailblazers when compared with the *salonnières*, they were not feminists. They were too traditional, too hemmed in by their generation to demand social and political rights. Nonetheless, in their desire for education, their willingness to go beyond the confines of the salon in pursuing their interests, and their championing of unity among women, the Bluestockings began the process of questioning women's role in society.

17. Which of the following best states the central idea of the passage?

(A) The establishment of literary salons was a response to reformers' demands for social rights for women.

(B) Literary salons were originally intended to be a meeting ground for intellectuals of both sexes, but eventually became social gatherings with little educational value.

(C) In England, as in France, the general prejudice against higher education for women limited women's function in literary salons to a primarily social one.

(D) The literary salons provided a sounding board for French and English women who called for access to all the educational institutions in their societies on an equal basis with men.

(E) For women, who did not have access to higher education as men did, literary salons provided an alternate route to learning and a challenge to some of society's basic assumptions about women.

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18. According to the passage, a significant distinction between the *salonnières* and Bluestockings was in the way each group regarded which of the following?

(A) The value of acquiring knowledge
(B) The role of pleasure in the activities of the literary salon
(C) The desirability of a complete break with societal traditions
(D) The inclusion of women of different backgrounds in the salons
(E) The attainment of full social and political equality with men

19. The author refers to differences in social background between *salonnières* and Bluestockings in order to do which of the following?

(A) Criticize the view that their choices of activities were significantly influenced by male salon members
(B) Discuss the reasons why literary salons in France were established before those in England
(C) Question the importance of the Bluestockings in shaping public attitudes toward educated women
(D) Refute the argument that the French salons had little influence over the direction the English salons took
(E) Explain the differences in atmosphere and style in their salons

20. Which of the following statements is most compatible with the principles of the *salonnières* as described in the passage?

(A) Women should aspire to be not only educated but independent as well.
(B) The duty of the educated woman is to provide an active political model for less educated women.
(C) Devotion to pleasure and art is justified in itself.
(D) Substance, rather than form, is the most important consideration in holding a literary salon.
(E) Men should be excluded from groups of women's rights supporters.

21. The passage suggests that the Bluestockings might have had a more significant impact on society if it had not been for which of the following?

(A) Competitiveness among their salons
(B) Their emphasis on individualism
(C) The limited scope of their activities
(D) Their acceptance of the French salon as a model for their own salons
(E) Their unwillingness to defy aggressively the conventions of their age

22. Which of the following could best be considered a twentieth-century counterpart of an eighteenth-century literary salon as it is described in the passage?

(A) A social sorority
(B) A community center
(C) A lecture course on art
(D) A humanities study group
(E) An association of moral reformers

23. To an assertion that Bluestockings were feminists, the author would most probably respond with which of the following?

(A) Admitted uncertainty
(B) Qualified disagreement
(C) Unquestioning approval
(D) Complete indifference
(E) Strong disparagement

24. Which of the following titles best describes the content of the passage?

(A) Eighteenth-Century Egalitarianism
(B) Feminists of the Eighteenth Century
(C) Eighteenth-Century Precursors of Feminism
(D) Intellectual Life in the Eighteenth Century
(E) Female Education Reform in the Eighteenth Century

GO ON TO THE NEXT PAGE.

When the same parameters and quantitative theory are used to analyze both termite colonies and troops of rhesus macaques, we will have a unified science of sociobiology. Can this ever really happen? As my own studies have advanced, I have been increasingly impressed with the functional similarities between insect and vertebrate societies and less so with the structural differences that seem, at first glance, to constitute such an immense gulf between them. Consider for a moment termites and macaques. Both form cooperative groups that occupy territories. In both kinds of society there is a well-marked division of labor. Members of both groups communicate to each other hunger, alarm, hostility, caste status or rank, and reproductive status. From the specialist's point of view, this comparison may at first seem facile—or worse. But it is out of such deliberate oversimplification that the beginnings of a general theory are made.

25. Which of the following best summarizes the author's main point?
    (A) Oversimplified comparisons of animal societies could diminish the likelihood of developing a unified science of sociobiology.
    (B) Understanding the ways in which animals as different as termites and rhesus macaques resemble each other requires training in both biology and sociology.
    (C) Most animals organize themselves into societies that exhibit patterns of group behavior similar to those of human societies.
    (D) Animals as different as termites and rhesus macaques follow certain similar and predictable patterns of behavior.
    (E) A study of the similarities between insect and vertebrate societies could provide the basis for a unified science of sociobiology.

26. The author's attitude toward the possibility of a unified theory in sociobiology is best described as which of the following?
    (A) Guarded optimism
    (B) Unqualified enthusiasm
    (C) Objective indifference
    (D) Resignation
    (E) Dissatisfaction

27. In discussing insect and vertebrate societies, the author suggests which of the following?
    (A) A distinguishing characteristic of most insect and vertebrate societies is a well-marked division of labor.
    (B) The caste structure of insect societies is similar to that of vertebrate societies.
    (C) Most insect and vertebrate societies form cooperative groups in order to occupy territory.
    (D) The means of communication among members of insect societies is similar to that among members of vertebrate societies.
    (E) There are significant structural differences between insect and vertebrate societies.

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. BEGIN: (A) participate (B) determine (C) persist (D) conclude (E) prevent

29. SHUN:
(A) seek actively
(B) perform occasionally
(C) understand intuitively
(D) answer correctly
(E) influence easily

30. EQUITY: (A) uncleanness (B) unfairness (C) unskillfulness (D) unreadiness (E) unfaithfulness

31. PROPAGATION: (A) regulation (B) emulation (C) extirpation (D) infiltration (E) revelation

32. PRESUMPTUOUS: (A) delicate (B) humble (C) certain (D) constructive (E) contemptible

33. VACILLATION: (A) perpetual activity (B) rapid growth (C) motionless balance (D) accurate focus (E) minimal response

34. PENCHANT: (A) stigma (B) dishonesty (C) disbelief (D) grievance (E) dislike

35. SOMATIC: (A) unitary (B) disjointed (C) nonphysical (D) by hand (E) with effort

36. CONFOUND: (A) specify (B) signify (C) scrutinize (D) discriminate between (E) coincide with

37. CHARY: (A) brisk (B) bold (C) untidy (D) ungenerous (E) unfriendly

38. FLAG: (A) sustain (B) strive (C) favor (D) cut (E) wax

SECTION 3
Time—30 minutes
30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

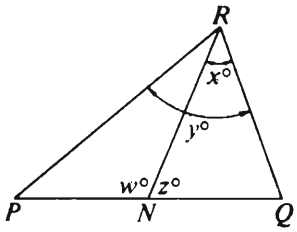
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

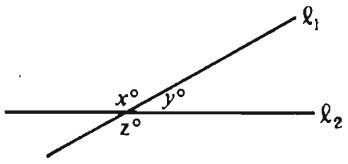


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	1.76×100	0.176×10



2.	$x + y$	$y + z$

One bacterial cell of a certain type is placed in a petri dish. Cells of this type divide once every day.

* 3.	The total number of bacterial cells in the dish at the end of 4 days if no cells die	6

$$5 + \frac{3}{4} = 3 + \frac{x}{4}$$

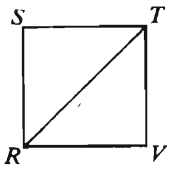
4.	x	13

5.	$\frac{3}{4} + \frac{4}{5}$	$\frac{3(5) + 4(4)}{4(5)}$

$$-2 < x < 2$$
$$-1 < y < 1$$

6.	x	y

	Column A	Column B



$RSTV$ is a square.

7.	The length of RT	Twice the length of RS

$$r = 2$$
$$s = 1$$

8.	$(r - 3s)^4$	$(r - 3s)^5$

An aviator in Mexico flew 300 kilometers in a straight line due east from point P to point Q and then 400 kilometers in a straight line due north to point R.

9.	The shortest distance from point P to point R	550 kilometers

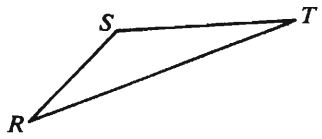
10.	The number of prime numbers between 10 and 20	The number of prime numbers between 30 and 40

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	$x > 0$	
11.	The number of minutes in $x + 100$ hours	The number of seconds in $60(x + 100)$ minutes

	Column A	Column B
12.	$\sqrt{\frac{5}{2}}$	$\frac{1}{2}\sqrt{10}$



	Column A	Column B
13.	$(RS)^2 + (ST)^2$	$(RT)^2$

	Column A	Column B
	$\sqrt{2x} = 4$ and $y^2 = 64$	
14.	x	y

	Column A	Column B
15.	The length of the diagonal of a square with each side of length 2	The height of a triangle with each side of length 3

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

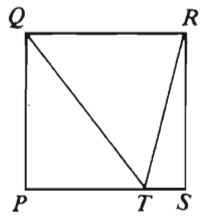
---

16. $3 \times \frac{2}{2} =$

(A) $\frac{1}{3}$ (B) 1 (C) 3 (D) 6 (E) $6\frac{1}{2}$

17. If $k = 15$, then $\frac{(k-2)180}{k} =$

(A) 156
(B) 23
(C) −23
(D) −204
(E) −360



18. In the figure above, the area of square $PQRS$ is 64. What is the area of $\triangle QRT$?

(A) 48 (B) 32 (C) 24 (D) 16 (E) 8

19. If x equals 25 percent of a number, then 125 percent of the number is

(A) $\frac{x}{1.25}$ (B) $\frac{x}{4}$ (C) $1.25x$
(D) $4x$ (E) $5x$

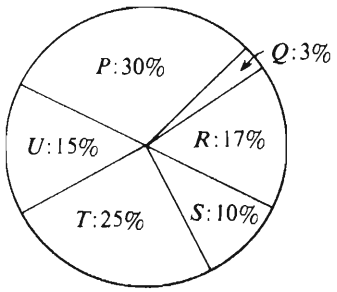
20. If the cost of a long-distance phone call is c cents for the first minute and $\frac{2}{3}c$ cents for each additional minute, what is the cost, in cents, of a 10-minute call of this type?

(A) $\frac{5}{3}c$ (B) $6c$ (C) $\frac{20}{3}c$
(D) $7c$ (E) $\frac{23}{3}c$

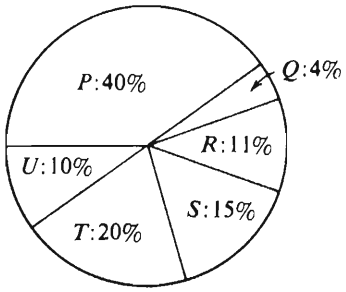
GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graphs.

PERCENT CONTRIBUTED TO PROFITS BY EACH OF THE 6 DIVISIONS, *P* THRU *U*, OF COMPANY Y FOR 1979 AND 1980



1979
Profits = $20,000,000



1980
Profits = $30,000,000

21. In 1980 what was the average of the amounts contributed to profits by Division *U* and Division *T*?

(A) $1,000,000
(B) $1,500,000
(C) $3,000,000
(D) $4,500,000
(E) $6,500,000

22. Division *R* contributed how much less to the profits of Company *Y* in 1980 than in 1979?

(A) $600,000
(B) $300,000
(C) $180,000
(D) $120,000
(E) $100,000

23. In 1979 the greatest contribution to profits by one of the six divisions was what percent of the least contribution?

(A) 10% (B) 90% (C) 100%
(D) 900% (E) 1,000%

24. If the six divisions are ranked each year according to their dollar contributions to profits, from greatest contribution to lowest, how many divisions ranked lower in 1980 than in 1979?

(A) None
(B) One
(C) Two
(D) Three
(E) Four

25. How many of the divisions contributed more dollars to profits in 1980 than in 1979?

(A) One
(B) Two
(C) Three
(D) Four
(E) Five

GO ON TO THE NEXT PAGE.

26. In a certain apartment building exactly $\frac{1}{3}$ of the apartments have two bedrooms and exactly $\frac{1}{7}$ of the two-bedroom apartments are front apartments. Which of the following could be the total number of apartments in the building?

(A) 42
(B) 50
(C) 51
(D) 56
(E) 57

27. Which of the following could be the area of an isosceles triangle with perimeter 18 and one side of length 8 ?

(A) 6
(B) 12
(C) 14
(D) 16
(E) 18

28. When a certain number is divided by 7, the remainder is 0. If the remainder is <u>not</u> 0 when the number is divided by 14, then the remainder must be

(A) 1 (B) 2 (C) 4 (D) 6 (E) 7

29. If $x > 0$ and $2x - 1 = \frac{1}{2x+1}$, then $x =$

(A) $\frac{1}{2}$

(B) $\frac{\sqrt{2}}{2}$

(C) 1

(D) $\sqrt{2}$

(E) $\sqrt{2} + 1$

30. If the radius of a circle is decreased by 30 percent, by what percent will the area of the circular region be decreased?

(A) 15%
(B) 49%
(C) 51%
(D) 60%
(E) 90%

SECTION 4
Time—30 minutes
30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

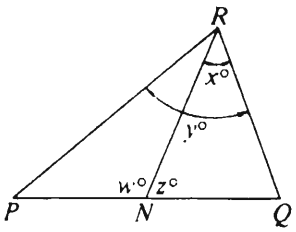
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

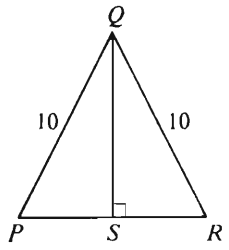


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

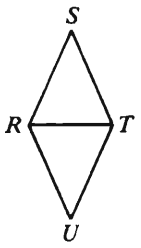
	Column A	Column B
1.	$2(10^3) + 5(10^2) + 7$	257
	$7n + x = 23$ $n = 3$	
2.	x	n
3.	$\frac{1}{4}$ of 5	$\frac{1}{5}$ of 4
	$0 < x < y$	
4.	$x - y$	$y - x$
5.	The number of bonds that were purchased for \$2,500	The number of bonds that were purchased for \$3,500
6.	The volume of a sphere that has radius 4	The volume of a sphere that has diameter 8
	a, b, and c are consecutive odd integers, not necessarily in that order.	
7.	$a - b$	$b - c$

	Column A	Column B
		
	The length of PR is 12.	
8.	The length of QS	8
	$x = -\lvert x \rvert$ $x \neq 0$	
9.	x	0
	The altitude of a certain triangular sail is 2 meters greater in length than its base. The area of the face of the sail is 24 square meters.	
10.	The length of the base of the sail	4 meters

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
11.	$(-1)^{77}(-2)^3$	8



$RS = ST = TU = UR = 10$

12.	RT	13

$\frac{x}{y} = \frac{1}{2}$ and $\frac{y}{z} = \frac{12}{5}$

x, y, and z are positive numbers.

13.	x	z

	Column A	Column B
14.	The area of a circular region with diameter x	The area of a square region with diagonal of length x

On July 1 the ratio of men to women in Club X was 9 to 20. During the month, 2 additional men and 2 additional women joined the club, and no members dropped out.

15.	The ratio of men to women in Club X at the end of July	$\frac{1}{2}$

GO ON TO THE NEXT PAGE.

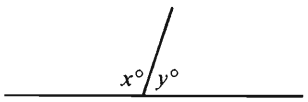
Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. If $x = 3$ is one solution to the equation $x^2 + rx - 20 = 4$, then $r =$

(A) -8
(B) -5
(C) -3
(D) 5
(E) 8

17. If the value of a certain fraction is equal to 0.4 and the denominator of the fraction is 15, then the numerator of the fraction is

(A) 6
(B) 8
(C) 9
(D) 12
(E) 37.5



18. In the figure above, the ratio of x to y is 3 to 2. What is the value of y?

(A) 108 (B) 72 (C) 36 (D) 3 (E) 2

19. What was the original price of an item if a discount of 20 percent reduced the price to \$100?

(A) \$80
(B) \$120
(C) \$125
(D) \$150
(E) \$250

20. The number of connections C that can be made through a switchboard to which T telephones are connected is given by the formula $C = \frac{T(T-1)}{2}$. How many more connections are possible with 30 telephones than with 20 telephones?

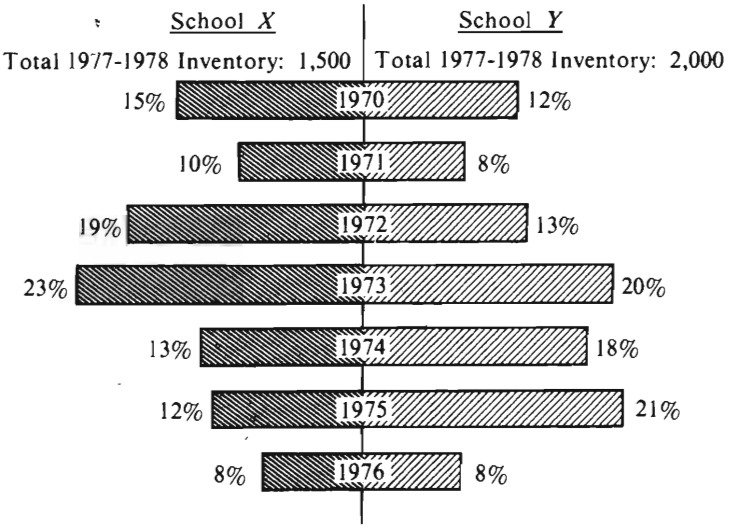
(A) 435 (B) 245 (C) 190
(D) 45 (E) 10

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graph.

1977-1978 TEXTBOOK INVENTORY FOR SCHOOLS *X* AND *Y*
BY YEAR OF PURCHASE

(as a percent of the 1977-1978 inventory)



Note: All books were purchased new on July 1 of each year.

21. What percent of School *Y*'s 1977-1978 textbook inventory was bought in 1975 ?

(A) 9%
(B) 12%
(C) 21%
(D) 33%
(E) It cannot be determined from the information given.

22. In School *X* how many of the inventoried textbooks were purchased prior to 1976 ?

(A) 100 (B) 120 (C) 140
(D) 1,340 (E) 1,380

23. How many of the inventoried textbooks were purchased by the two schools combined during the years 1974, 1975, and 1976 ?

(A) 495
(B) 940
(C) 1,020
(D) 1,435
(E) 2,800

24. If School *X* purchased 300 textbooks in 1971 and all of these textbooks either were counted in the inventory or had been discarded before the inventory, what percent of these textbooks had been discarded?

(A) 10%
(B) 20%
(C) 50%
(D) 80%
(E) 100%

25. Which of the following statements can be inferred from the graph?

I. School *X* has a smaller enrollment than School *Y*.
II. If the age of a book is the number of years since purchase, then the average (arithmetic mean) age of a book in the School *Y* inventory is less than that of a book in the School *X* inventory.
III. According to the inventory, School *X* and School *Y* purchased the same number of textbooks in 1976.

(A) None (B) I only (C) II only
(D) I and II (E) II and III

GO ON TO THE NEXT PAGE.

26. If $\frac{2}{3}$ of the number of women attending a certain dance is equal to $\frac{1}{2}$ the number of men attending, what fraction of those attending are women?

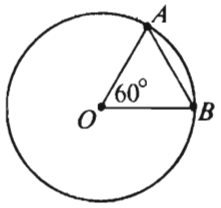
(A) $\frac{2}{5}$

(B) $\frac{3}{7}$

(C) $\frac{5}{7}$

(D) $\frac{3}{4}$

(E) $\frac{5}{6}$



27. In the figure above, O is the center of the circle. If $AB = 10$, what is the area of the circle?

(A) 10π (B) 20π (C) 25π
(D) 50π (E) 100π

28. How many of the positive integers less than 25 are 2 less than an integer multiple of 4 ?

(A) Two
(B) Three
(C) Four
(D) Five
(E) Six

29. If $7x - 4y = -1$ and $5x + 3y = 52$, then $x - y =$

(A) -4
(B) -3
(C) 3
(D) 4
(E) 5

30. The floor of a company's storage room has an area of 20,000 square feet. If the floor is in the shape of a square, approximately how many feet long is each side?

(A) 140 (B) 450 (C) 500
(D) 1,000 (E) 5,000

SECTION 5

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-4

All padlocks manufactured by the Guaranteed Combination Lock Company have a combination that consists of four elements—a one-digit number, a two-digit number, and two letters of the alphabet. Each combination conforms to the following rules:

(1) The one-digit number is the first element in the combination.
(2) The two letters of the alphabet are not adjacent elements in the combination.
(3) The two-digit number consists of two different numerals.
(4) The two-digit number has no numerals in common with the one-digit number.

1. Which of the following is a sequence of elements that conforms to the rules?

(A) 6-73-D-M
(B) 2-X-37-G
(C) 39-H-Y-6
(D) H-24-K-4
(E) 9-B-89-B

2. Which of the following must always be true of a combination?

(A) The second element is a two-digit number.
(B) The third element is a letter of the alphabet.
(C) The third element is a one-digit number.
(D) The fourth element is a two-digit number.
(E) The fourth element is a letter of the alphabet.

3. Which of the following CANNOT be the first element of a combination that has K-53-J as its second, third, and fourth elements?

(A) 5
(B) 6
(C) 7
(D) 8
(E) 9

4. The sequence of elements 9-K-M-29 violates which of the rules given?

(A) Rule 2 only
(B) Rule 3 only
(C) Rule 2 and rule 4 only
(D) Rule 3 and rule 4 only
(E) Rule 2, rule 3, and rule 4

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5. If your radio was made after 1972, it has a stereo feature.

   The statement above can be deduced logically from which of the following statements?

   (A) Only if a radio was made after 1972 could it have a stereo feature.
   (B) All radios made after 1972 have a stereo feature.
   (C) Some radios made before 1972 had a stereo feature.
   (D) Some stereo features are found in radios made after 1972.
   (E) Stereo features for radios were fully developed only after 1972.

6. Rule 1 of Game X provides that anyone who refuses to become a player in Game X shall at the moment of refusal be assessed a ten-point penalty in the game.

   Which of the following claims is implicit in Rule 1 ?

   (A) All those who agree to play Game X will achieve scores higher than the scores of those who were assessed a penalty under Rule 1.
   (B) A person can avoid a ten-point penalty by initially agreeing to become a player and then withdrawing after the game is under way.
   (C) The rules of Game X supply a procedure for determining when the game is over.
   (D) A person who refuses to play Game X cannot be declared a loser in the game.
   (E) A person can at the same time decline to play Game X and yet be a part of the game.

7. A common misconception is that university hospitals are better than community or private hospitals. In fact, university hospitals have a lower survival rate for patients than do other hospitals. From this it seems clear that the quality of care at university hospitals is lower than that at other hospitals.

   Which of the following, if true, most forcefully undermines the argument of the passage above?

   (A) Many doctors divide their working hours between a university and a community or private hospital.
   (B) Doctors at university hospitals often earn less than doctors at private hospitals.
   (C) University and community hospitals often cannot afford the elaborate facilities of private hospitals.
   (D) The emphasis at many university hospitals is on pure research rather than on the treatment and care of patients.
   (E) The patients who seek help at university hospitals are usually more seriously ill than those at private or community hospitals.

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Questions 8-11

A pet store owner is setting up several fish tanks, each to contain exactly six fish so chosen from species F, G, H, I, J, K, and L that none of the fish in any given tank will fight. Fish of any of the species above can be placed in a tank together except for the following restrictions:

Fish of species F will fight with fish of species H, J, and K.
Fish of species I will fight with fish of species G and K.
If three or more fish of species I are in one tank, they will fight with each other.
Fish of species J will fight with fish of species L.
If a fish of species G is to be in a tank, at least one fish of species K must also be in the tank.

8. If a tank is to contain fish of exactly three different species, these species could be

(A) F, G, and I (B) F, I, and K
(C) G, H, and I (D) H, I, and J
(E) I, J, and L

9. If there are to be exactly two species represented in a tank, and three fish of species J are to be in the tank, the other three fish in that tank could be from which of the following species?

(A) F (B) G (C) H (D) I (E) L

10. If a tank is to contain fish of exactly four different species, it CANNOT contain fish of species

(A) F (B) G (C) H (D) J (E) L

11. Fish of which of the following species could be put into a tank with fish of species G?

(A) F and I (B) F and J (C) H and I
(D) H and K (E) I and K

GO ON TO THE NEXT PAGE.

Questions 12-17

Two circular dials of exactly the same size are mounted on a wall side by side in such a way that their perimeters touch at one point.

Dial 1, which is on the left, spins clockwise around its center, and dial 2, which is on the right, spins counterclockwise around its center. (Assume that there is no friction at the point of contact between the dials.)

Each dial has marked on its perimeter three points that are at equal distances around the perimeter from each other.

Going clockwise on each dial the points marked on dial 1 are N, O, and P, and the points marked on dial 2 are X, Y, and Z.

12. Which of the following lists the points on a dial in an order in which they could pass consecutively through the point of contact between the dials?

(A) O, N, P (B) O, P, O (C) X, Z, Y
(D) Y, X, Z (E) Z, X, Z

13. If points O and Z are just meeting at the point of contact between the dials, and if dial 1 spins at the same speed as dial 2, what is the smallest number of revolutions of each dial that will bring O and Z together again?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

14. If points N and Y are just meeting at the point of contact between the dials, and if dial 1 spins at the same speed as dial 2, which of the following pairs of points will also meet in the course of the next full revolution of the dials?

(A) N and Z (B) O and X (C) O and Z
(D) P and X (E) P and Y

15. Which of the following is a possible sequence of pairs of points meeting consecutively at the point of contact between the dials if dial 1 spins at the same speed as dial 2 ?

(A) N and O followed by X and Z
(B) N and X followed by O and Z
(C) O and X followed by N and X
(D) O and Y followed by N and Z
(E) P and Z followed by P and X

16. If points P and X are just meeting at the point of contact between the dials, and if dial 2 spins at exactly double the speed of dial 1, which of the following pairs of points will be the next pair to meet at the point of contact?

(A) N and Y (B) N and Z (C) O and X
(D) O and Z (E) P and Y

17. If points P and Y are just meeting at the point of contact between the dials, and if dial 1 spins at exactly three times the speed of dial 2, which of the following pairs of points will be the next pair to meet at the point of contact?

(A) N and X (B) N and Z (C) O and Y
(D) P and X (E) P and Z

GO ON TO THE NEXT PAGE.

Questions 18-22

Ten different fabrics are being displayed on racks along one wall of a store. The racks are next to each other in a straight line and are numbered consecutively from one to ten. On each rack is a single bolt of a different fabric. One fabric is green, two fabrics are different shades of brown, three fabrics are different shades of purple, and the remaining four fabrics are different shades of red.

Purple fabrics are on racks one and ten.
The two brown fabrics are on racks next to each other.
No red fabric is on a rack next to a brown fabric.
No purple fabric is on a rack next to the green fabric.

18. If a purple fabric is on rack two and red fabrics are on racks three and four, the green fabric must be on which of the following racks?

(A) Five (B) Six (C) Seven
(D) Eight (E) Nine

19. If the four red fabrics are on four consecutive racks, the green fabric and one of the brown fabrics could be on which of the following racks, respectively?

(A) Two and three (B) Three and four
(C) Four and five (D) Five and six
(E) Six and seven

20. Which of the following are colors of fabrics that CANNOT be on racks two, three, and four, respectively?

(A) Purple, red, green
(B) Purple, brown, brown
(C) Brown, brown, purple
(D) Red, red, green
(E) Red, red, red

21. If a purple fabric is on rack three and a brown fabric is on rack four, the green fabric must be on which of the following racks?

(A) Two (B) Five (C) Six
(D) Seven (E) Nine

22. If the green fabric is on rack five and a brown fabric is on rack four, which of the following must be true?

(A) A red fabric is on rack two.
(B) A red fabric is on rack nine.
(C) A purple fabric is on rack six.
(D) A purple fabric is on rack seven.
(E) A purple fabric is on rack eight.

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23. Literary historians today have rejected conventional analyses of the development of English Renaissance drama. They no longer accept the idea that the sudden achievement of Elizabethan playwrights was a historical anomaly, a sort of magical rediscovery of ancient Greek dramatic form applied to contemporary English subject matter. Instead, most students of the theater now view Elizabethan drama as being organically related to traditional local drama, particularly medieval morality plays.

Which of the following is NOT consistent with the passage above?

(A) England had a dramatic tradition before the Renaissance period.
(B) Elizabethan drama, once thought to be a sudden blossoming forth of creativity, is now seen as part of a historical continuum.
(C) Historians' views of the antecedents of English Renaissance drama have changed considerably.
(D) Current scholarship applies an evolutionary model to English Renaissance drama.
(E) Although English Renaissance drama treats English subject matter, its source of form and method is classical Greek drama.

GO ON TO THE NEXT PAGE.

24. In 1975, 35 percent of state W's work force was employed in manufacturing jobs. That percentage dropped in each following year until in 1982 it reached 25 percent.

If the statements above are true, all of the following statements about changes in W's work force between 1975 and 1982 could also be true EXCEPT:

(A) The number of people in the work force increased, while the number of people employed in manufacturing jobs decreased.
(B) The number of people in the work force decreased, while the number of people employed in manufacturing jobs increased.
(C) Both the number of people in the work force and the number of people employed in manufacturing jobs increased.
(D) Both the number of people in the work force and the number of people employed in manufacturing jobs decreased.
(E) The number of people in the work force remained constant, while the number of people employed in manufacturing jobs decreased.

25. The excessive number of safety regulations that the federal government has placed on industry poses more serious hardships for big businesses than for small ones. Since large companies do everything on a more massive scale, they must alter more complex operations and spend much more money to meet governmental requirements.

Which of the following, if true, would most weaken the argument above?

(A) Small companies are less likely than large companies to have the capital reserves for improvements.
(B) The operations of small companies frequently rely on the same technologies as the operations of large companies.
(C) Safety regulation codes are uniform, established without reference to size of company.
(D) Large companies typically have more of their profits invested in other businesses than do small companies.
(E) Large companies are in general more likely than small companies to diversify their markets and products.

SECTION 6
Time—30 minutes
25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-4

Seats on a small plane are being assigned to six passengers—N, P, Q, R, S, and T. The eight seats on the plane are in four rows, numbered 1 through 4, and each row has two seats. Seat assignments are made according to the following conditions:

N must sit alone in a row.
P must sit in the same row as R.
Q cannot sit in the same row as S.
The rows with only one passenger must be row 1 and row 3.

1. Which of the following passengers could be assigned to sit in the same row as Q?
   (A) N
   (B) P
   (C) R
   (D) S
   (E) T

2. If P and R are in row 2, which of the following must be true?
   (A) N is in row 1.
   (B) Q is in row 1.
   (C) Q is in row 4.
   (D) S is in row 3.
   (E) T is in row 4.

3. Which of the following is the total number of passengers eligible to be the passenger assigned to sit in the same row as T?
   (A) 1
   (B) 2
   (C) 3
   (D) 4
   (E) 5

4. If Q and T are assigned to sit together in a row, which of the following passengers could be assigned to sit in row 3?
   (A) P
   (B) Q
   (C) R
   (D) S
   (E) T

GO ON TO THE NEXT PAGE.

5. Public education suffers from what can be diagnosed as the sickness of an overgoverned society. This sickness denies many parents control over the kind of education their children receive. The power once held by parents has gravitated to professional educators. The sickness has been aggravated by increasing centralization and bureaucratization of schools.

   Which of the following, if true, would weaken the claim that there is continuing erosion of parents' control over their children's education?

   (A) As a result of community pressure, growing numbers of school administrators follow recommendations made by parents.
   (B) The number of professional educators has risen sharply over the last decade even though the number of students has declined.
   (C) Parents' organizations that lobby for changes in school curriculums are generally ineffectual.
   (D) More members of school boards are appointed by school administrators than are elected by the public.
   (E) The use of state-wide curriculum programs increased in the United States during the past two decades.

6. From a certain farming region, trucks can carry vegetables to market in New Mexico in two days for a total cost of $300. A train will carry the vegetables there in four days for $200. If reducing time in transit is more important to the owner of the vegetables than is reducing the shipping bill, he or she will send the vegetables by truck.

   Which of the following is an assumption made in the passage above?

   (A) Vegetables can be sold more profitably when shipped by train than by truck.
   (B) Other than speed and cost, there are no significant differences between truck and train transportation from the farming region to New Mexico.
   (C) The time required to ship vegetables by train from the farming region to New Mexico could be reduced to two days if the price for this service were raised.
   (D) Most owners of vegetables in the region are more concerned with shipping costs than with the time involved in shipping vegetables to market.
   (E) Transportation of vegetables by truck is worth at least $200 per day to owners of the vegetables in the farming region.

7. The expression "the doctrine of unshakable foundations" was once used by a critic in an effort to illuminate the dogmatic nature of certain economic and political philosophies whose adherents, when confronted with the failure of a policy designed to put their philosophy into practice, can conceive of only one reaction: to design another, different policy for putting it into practice.

   It can be inferred from the passage above that the critic would approve if the adherents

   (A) had the courage to try a failed policy again without any changes
   (B) had refrained from trying to put any of their philosophies into practice
   (C) allowed failure of a policy to lead them to question the underpinnings of their philosophies
   (D) concluded from the failure of a policy of theirs that the policy must not have reflected their philosophy adequately
   (E) carefully analyzed those traits of a failed policy that appear promising despite the overall failure

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Questions 8-13

The members of the Public Service Commission and the members of the Rent Control Commission are to be selected from exactly six qualified candidates. The six candidates are U, V, W, X, Y, and Z. The following rules apply:

Each commission must have exactly three members.
The two commissions must have at least one member in common.
U cannot be on a commission with X.
If X is selected for a commission, Y must also be selected for that commission.

8. If the members of the Public Service Commission are selected first, which of the following could be those selected?

(A) U, V, and X
(B) U, X, and Z
(C) V, W, and X
(D) V, X, and Y
(E) W, X, and Z

9. If the two commissions have parallel terms of office, which of the following could be selected as the members of the Public Service Commission and as the members of the Rent Control Commission, respectively, for one such term of office?

(A) U, V, and W; X, Y, and Z
(B) U, W, and Y; V, X, and Z
(C) U, X, and Y; U, X, and Z
(D) V, W, and Y; V, W, and X
(E) W, X, and Y; X, Y, and Z

10. If the members of the Public Service Commission are V, W, and Z, and if the Rent Control Commission is to have as many members in common with the Public Service Commission as the rules allow, the Rent Control Commission must consist of

(A) U, V, and W
(B) V, W, and Z
(C) V, X, and Z
(D) W, Y, and Z
(E) X, Y, and Z

11. If U, V, and W make up the Public Service Commission, and W, Y, and Z make up the Rent Control Commission, which of these commission members could yield his or her place on a commission to X without necessitating any other membership changes?

(A) U
(B) V
(C) W
(D) Y
(E) Z

12. If U and X are each selected for a commission, and only Z is selected for both commissions, which of the following must be true?

(A) V is selected for the same commission as W.
(B) W is selected for the same commission as Y.
(C) W is selected for the same commission as X.
(D) U is selected for a different commission than Y.
(E) X is selected for a different commission than Y.

13. If X and Z are both selected for the Public Service Commission, and if U is selected for the Rent Control Commission, each of the following pairs of people could be the other two members of the Rent Control Commission EXCEPT

(A) V and W
(B) V and Z
(C) W and Y
(D) W and Z
(E) Y and Z

GO ON TO THE NEXT PAGE.

Questions 14-17

A variety show producer is auditioning five performers in five consecutive auditions. Each performer auditions alone, and only once. The five performers are: two singers (a tenor and a soprano), a dancer, a magician, and a comedian. The auditions must be scheduled according to the following conditions:

The two singers cannot audition one after the other.
The magician must audition immediately before a singer.
The comedian must audition immediately before or immediately after the dancer.

14. If the comedian auditions first, which of the following must be true?
    (A) The soprano auditions third.
    (B) The magician auditions fourth.
    (C) The tenor auditions fifth.
    (D) The soprano auditions sometime earlier than the dancer.
    (E) The dancer auditions immediately before the tenor.

15. If the tenor auditions first, and the soprano auditions fifth, which of the following must be true?
    (A) The comedian auditions sometime after the magician.
    (B) The comedian auditions immediately after the dancer.
    (C) The magician auditions sometime after the dancer.
    (D) The magician auditions sometime before the comedian.
    (E) The dancer auditions immediately before the magician.

16. If the comedian, the soprano, and the magician audition one after the other, in that order, which of the following must be true?
    (A) The comedian is the first of the five to audition.
    (B) The soprano is the second of the five to audition.
    (C) The magician is the third of the five to audition.
    (D) The dancer is the fourth of the five to audition.
    (E) The tenor is the fifth of the five to audition.

17. If the magician auditions sometime earlier than the dancer, a singer CANNOT audition in which of the following positions?
    (A) First
    (B) Second
    (C) Third
    (D) Fourth
    (E) Fifth

GO ON TO THE NEXT PAGE.

Questions 18-22

On an island there are exactly seven towns: T, U, V, W, X, Y, and Z. All existing and projected roads on the island are two-way and run perfectly straight between one town and the next. All distances by road are distances from the main square of one town to the main square of another town. U is the same distance by road from T, V, and W as Y is from X and Z. The following are all of the currently existing roads and connections by road on the island:

Road 1 goes from T to V via U.
Road 2 goes from U directly to W.
The Triangle Road goes from X to Y, from Y on to Z, and from Z back to X.
Any main square reached by two roads is an interchange between them, and there are no other interchanges between roads.

18. Which of the following is a town from which exactly two other towns can be reached by road?

(A) T (B) U (C) V (D) W (E) X

19. It is possible that the distance by road from X to Y is unequal to the distance by road from

(A) T to U (B) U to V (C) U to W (D) X to Z (E) Y to Z

20. Which of the following is a pair of towns connected by two routes by road that have no stretch of road in common?

(A) T and U (B) U and V (C) V and W (D) W and X (E) X and Y

21. If a projected road from T to Y were built, then the shortest distance by road from W to X would be the same as the shortest distance by road from Z to

(A) T (B) U (C) V (D) X (E) Y

22. If two projected roads were built, one from T directly to Y and one from V directly to Z, then each of the following would be a complete list of the towns lying along one of the routes that a traveler going by road from U to X could select EXCEPT

(A) T, Y (B) T, Z (C) V, Z (D) T, Y, Z (E) V, Z, Y

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* 23. If an investment has produced no profit, tax relief predicated on having made the investment is no help; any corporate manager who fears that a new asset will not make money is scarcely comforted by promises of reductions in taxes the corporation will not owe.

Which of the following is the most reliable inference to draw from the passage above?

(A) An effective way to discourage unprofitable corporate investment is to predicate tax relief on the making of profitable investments.
(B) Corporate managers are likely to ignore tax considerations in deciding to invest in assets they believe will be profitable.
(C) The promise of tax benefits for making new investments will not in and of itself stimulate new investment.
(D) The less importance a corporate manager attaches to tax considerations, the more likely it is that the manager will accurately predict the profitability of an investment.
(E) The critical factor in a corporate investment decision is likely to be a corporate manager's emotional response to perceived business conditions.

GO ON TO THE NEXT PAGE.

24. The results of a recent poll in the United States indicate that the public, by 80 percent to 17 percent, opposes relaxation of existing regulation of air pollution. Furthermore, not a single major segment of the public wants environmental laws made less strict. The results of this poll reveal that legislators, by voting for renewal of the Clean Air Act, will be responsive to the will of the public without alienating any significant special-interest groups.

Which of the following pieces of information would be most useful in evaluating the logic of the argument presented above?

(A) The groups in the population that were defined as major segments of the public and the groups defined as special-interest groups
(B) The length of time that current federal environmental laws have been in effect and the length of time that states have regulated air pollution
(C) The probable economic effect of renewal of the Clean Air Act on those opposed to and those in favor of relaxing environmental laws
(D) The people whom the author hopes to influence by citing the results of the poll
(E) The percentage of those surveyed who chose not to respond to the questions asked of them

25. After a rebellion in a certain country was put down, the country's parliament debated how to deal with the defeated rebels. One side proposed that all the rebels be imprisoned in order to deter those who might be strongly tempted to rebel in the future. The other side argued against imprisonment because it would only discourage future insurrectionists from surrendering.

Both positions logically depend on the assumption that

(A) imprisonment is a harsh penalty
(B) a rebel will prefer a sentence of imprisonment to death
(C) there will be no future rebellion in the country
(D) it is unlikely that future rebels will surrender
(E) resistance to authority is weakened by harsh threats

FOR GENERAL TEST 6 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 1			Section 2		
Number	Answer	P+	Number	Answer	P+
1	B	82	1	A	89
2	D	59	2	D	75
3	B	54	3	A	67
4	E	56	4	C	60
5	E	52	5	D	69
6	B	32	6	D	50
7	C	29	7	B	52
8	E	90	8	C	83
9	D	84	9	E	89
10	A	40	10	C	48
11	E	80	11	D	72
12	D	53	12	A	50
13	A	47	13	D	31
14	D	35	14	D	54
15	C	27	15	B	31
16	A	16	16	E	24
17	B	55	17	E	83
18	D	35	18	B	57
19	A	63	19	E	81
20	C	67	20	C	59
21	B	54	21	E	72
22	A	58	22	D	40
23	E	59	23	B	66
24	C	62	24	C	50
25	A	55	25	E	62
26	B	65	26	A	70
27	E	33	27	E	16
28	B	91	28	D	94
29	C	84	29	A	87
30	A	84	30	B	83
31	C	72	31	C	51
32	B	49	32	B	53
33	A	51	33	C	45
34	B	31	34	E	45
35	D	40	35	C	42
36	D	29	36	D	34
37	E	24	37	B	32
38	D	23	38	E	10

QUANTITATIVE ABILITY					
Section 3			Section 4		
Number	Answer	P+	Number	Answer	P+
1	A	96	1	A	91
2	C	91	2	B	94
3	A	86	3	A	90
4	B	86	4	B	86
5	C	86	5	D	87
6	D	78	6	C	84
7	B	83	7	D	83
8	A	82	8	C	67
9	B	71	9	B	70
10	A	68	10	A	64
11	B	55	11	C	65
12	C	49	12	D	38
13	D	41	13	A	60
14	D	25	14	A	43
15	A	42	15	D	17
16	C	95	16	D	86
17	A	93	17	A	85
18	B	76	18	B	73
19	E	70	19	C	77
20	D	71	20	B	73
21	D	70	21	C	85
22	E	61	22	E	71
23	E	47	23	D	71
24	C	36	24	C	55
25	D	34	25	C	35
26	A	60	26	B	28
27	B	40	27	E	61
28	E	60	28	E	43
29	B	45	29	A	31
30	C	27	30	A	41

ANALYTICAL ABILITY					
Section 5			Section 6		
Number	Answer	P+	Number	Answer	P+
1	B	91	1	E	91
2	E	83	2	E	38
3	A	94	3	B	75
4	C	86	4	D	93
5	B	81	5	A	79
6	E	66	6	B	59
7	E	64	7	C	57
8	D	85	8	D	93
9	C	77	9	E	75
10	A	73	10	B	47
11	D	87	11	E	67
12	A	45	12	D	70
13	A	67	13	A	42
14	B	54	14	B	65
15	D	52	15	C	55
16	D	41	16	E	71
17	E	37	17	D	28
18	C	37	18	E	33
19	E	32	19	D	37
20	A	26	20	E	13
21	C	50	21	C	36
22	B	46	22	B	36
23	E	37	23	C	50
24	B	49	24	A	44
25	A	31	25	A	50

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 6 ONLY AND THE PERCENTS BELOW*

Raw Score	Scaled Scores and Percents Below						Raw Score	Scaled Scores and Percents Below					
	Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below		Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below
72-76	800	99					35	410	31	500	37	610	74
71	790	99					34	400	28	490	34	590	69
70	780	99					33	390	26	480	32	580	67
69	760	99					32	380	24	460	27	560	61
68	750	98					31	370	22	450	26	550	59
67	740	98					30	360	18	440	23	530	53
66	720	96					29	360	18	430	21	520	50
65	710	96					28	350	17	410	18	500	44
64	700	95					27	340	15	400	16	490	41
63	690	94					26	330	13	390	14	470	36
62	680	93					25	330	13	380	13	460	33
61	660	91					24	320	11	360	10	440	27
60	650	89	800	98			23	310	10	350	9	430	25
59	640	88	800	98			22	300	8	340	8	410	21
58	630	86	790	98			21	290	7	330	7	400	18
57	620	85	780	97			20	280	6	310	5	380	15
56	610	84	770	95			19	270	4	300	4	370	13
55	600	82	750	92			18	260	3	290	3	350	10
54	590	80	740	90			17	250	3	280	3	340	9
53	580	78	730	89			16	240	2	260	2	320	6
52	570	75	720	87			15	230	1	250	1	310	5
51	560	73	700	83			14	220	1	240	1	300	4
50	550	71	690	81	800	99	13	210	1	230	1	280	3
49	540	68	680	79	800	99	12	200	0	210	0	270	2
48	530	65	670	77	800	99	11	200	0	200	0	250	1
47	520	63	650	72	790	98	10	200	0	200	0	240	1
46	510	60	640	71	770	98	9	200	0	200	0	220	1
45	500	57	630	68	760	97	8	200	0	200	0	210	0
44	490	55	620	65	740	95	0-7	200	0	200	0	200	0
43	480	52	600	61	730	94							
42	470	49	590	59	710	92							
41	460	45	580	56	700	91							
40	450	43	560	52	680	88							
39	440	40	550	49	670	86							
38	430	37	540	46	650	84							
37	420	34	530	44	640	81							
36	420	34	510	39	620	77							

*Percent scoring below the scaled score, based on the performance of the 816,621 examinees who took the General Test between October 1, 1983, and September 30, 1986.

TEST 7

SECTION 1

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Her ------- should not be confused with miserliness; as long as I have known her, she has always been willing to assist those who are in need.

   (A) intemperance (B) intolerance
   (C) apprehension (D) diffidence
   (E) frugality

2. Natural selection tends to eliminate genes that cause inherited diseases, acting most strongly against the most severe diseases; consequently, hereditary diseases that are ------- would be expected to be very -------, but, surprisingly, they are not.

   (A) lethal..rare
   (B) untreated..dangerous
   (C) unusual..refractory
   (D) new..perplexing
   (E) widespread..acute

3. Unfortunately, his damaging attacks on the ramifications of the economic policy have been ------- by his wholehearted acceptance of that policy's underlying assumptions.

   (A) supplemented (B) undermined
   (C) wasted (D) diverted (E) redeemed

4. During the opera's most famous aria the tempo chosen by the orchestra's conductor seemed -------, without necessary relation to what had gone before.

   (A) tedious (B) melodious (C) capricious
   (D) compelling (E) cautious

5. In the machinelike world of classical physics, the human intellect appears -------, since the mechanical nature of classical physics does not ------- creative reasoning, the very ability that had made the formulation of classical principles possible.

   (A) anomalous..allow for
   (B) abstract..speak to
   (C) anachronistic..deny
   (D) enduring..value
   (E) contradictory..exclude

6. During the 1960's assessments of the family shifted remarkably, from general endorsement of it as a worthwhile, stable institution to widespread ------- it as an oppressive and bankrupt one whose ------- was both imminent and welcome.

   (A) flight from..restitution
   (B) fascination with..corruption
   (C) rejection of..vogue
   (D) censure of..dissolution
   (E) relinquishment of..ascent

7. Documenting science's ------- philosophy would be -------, since it is almost axiomatic that many philosophers use scientific concepts as the foundations for their speculations.

   (A) distrust of..elementary
   (B) influence on..superfluous
   (C) reliance on..inappropriate
   (D) dependence on..difficult
   (E) differences from..impossible

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. SCALPEL:SURGEON ::
   (A) laser:agronomist
   (B) magnet:ecologist
   (C) syringe:geologist
   (D) telescope:astronomer
   (E) microscope:geometrician

9. APPLE:FRUIT :: (A) egg:chicken
   (B) rung:chair (C) wool:fabric
   (D) fuse:dynamite (E) wick:candle

10. ENVELOPE:LETTER :: (A) scarf:hat
    (B) box:bag (C) crate:produce
    (D) neck:head (E) blood:heart

11. PANEGYRIC:EULOGIZE ::
    (A) ballad:stigmatize (B) ode:criticize
    (C) lampoon:satirize (D) tirade:entertain
    (E) treatise:dispute

12. OVERDOSE:PRESCRIPTION ::
    (A) deprivation:materialism
    (B) indiscretion:convention
    (C) affliction:sympathy
    (D) adventure:expedition
    (E) drug:medicine

13. FRESCO:WALL :: (A) fountain:courtyard
    (B) parquetry:floor (C) thatch:roof
    (D) statuary:passage (E) gargoyle:gutter

14. HAMMER:ANVIL :: (A) knocker:door
    (B) stick:gong (C) hand:drum
    (D) pestle:mortar (E) gavel:lectern

15. RELEVANT:CRUCIAL ::
    (A) marginal:unique
    (B) perceptible:obvious
    (C) apparent:real
    (D) peripheral:central
    (E) possible:desirable

16. PERFUNCTORILY:INSPIRATION ::
    (A) insolently:veneration
    (B) ardently:passion
    (C) phlegmatically:composure
    (D) surreptitiously:obsession
    (E) haltingly:reluctance

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Great comic art is never otherwordly, it does not seek to mystify us, and it does not deny ambiguity by branding as evil whatever differs from good. Great comic artists assume that truth may bear all lights, and thus they seek to accentuate contradictions in social action, not gloss over or transcend them by appeals to extrasocial symbols of divine ends, cosmic purpose, or laws of nature. The moment of transcendence in great comic art is a social moment, born out of the conviction that we are human, even though we try to be gods. The comic community to which artists address themselves is a community of reasoning, loving, joyful, compassionate beings, who are willing to assume the human risks of acting rationally. Without invoking gods or demons, great comic art arouses courage in reason, courage which grows out of trust in what human beings can do as humans.

17. The passage suggests that great comic art can be characterized as optimistic about the ability of humans to

(A) rid themselves of pride
(B) transcend the human condition
(C) differentiate clearly between good and evil
(D) avoid social conflicts
(E) act rationally

18. It can be inferred from the passage that the author admires great comic artists primarily for their

(A) ability to understand the frequently subtle differences between good and evil
(B) ability to reconcile the contradictions in human behavior
(C) ability to distinguish between rational and irrational behavior
(D) insistence on confronting the truth about the human condition
(E) insistence on condemning human faults and weaknesses

19. Which of the following is the most accurate description of the organization of the passage?

(A) A sequence of observations leading to a prediction
(B) A list of inferences drawn from facts stated at the beginning of the passage
(C) A series of assertions related to one general subject
(D) A statement of the major idea, followed by specific examples
(E) A succession of ideas moving from specific to general

GO ON TO THE NEXT PAGE.

It has long been known that the rate of oxidative metabolism (the process that uses oxygen to convert food into energy) in any animal has a profound effect on its living patterns. The high metabolic rate of small animals, for example, gives them sustained power and activity per unit of weight, but at the cost of requiring constant consumption of food and water. Very large animals, with their relatively low metabolic rates, can survive well on a sporadic food supply, but can generate little metabolic energy per gram of body weight. If only oxidative metabolic rate is considered, therefore, one might assume that smaller, more active, animals could prey on larger ones, at least if they attacked in groups. Perhaps they could if it were not for anaerobic glycolysis, the great equalizer.

Anaerobic glycolysis is a process in which energy is produced, without oxygen, through the breakdown of muscle glycogen into lactic acid and adenosine triphosphate (ATP), the energy provider. The amount of energy that can be produced anaerobically is a function of the amount of glycogen present—in all vertebrates about 0.5 percent of their muscles' wet weight. Thus the anaerobic energy reserves of a vertebrate are proportional to the size of the animal. If, for example, some predators had attacked a 100-ton dinosaur, normally torpid, the dinosaur would have been able to generate almost instantaneously, via anaerobic glycolysis, the energy of 3,000 humans at maximum oxidative metabolic energy production. This explains how many large species have managed to compete with their more active neighbors: the compensation for a low oxidative metabolic rate is glycolysis.

There are limitations, however, to this compensation. The glycogen reserves of any animal are good, at most, for only about two minutes at maximum effort, after which only the normal oxidative metabolic source of energy remains. With the conclusion of a burst of activity, the lactic acid level is high in the body fluids, leaving the large animal vulnerable to attack until the acid is reconverted, via oxidative metabolism, by the liver into glucose, which is then sent (in part) back to the muscles for glycogen resynthesis. During this process the enormous energy debt that the animal has run up through anaerobic glycolysis must be repaid, a debt that is proportionally much greater for the larger vertebrates than for the smaller ones. Whereas the tiny shrew can replace in minutes the glycogen used for maximum effort, for example, the gigantic dinosaur would have required more than three weeks. It might seem that this interminably long recovery time in a large vertebrate would prove a grave disadvantage for survival. Fortunately, muscle glycogen is used only when needed and even then only in whatever quantity is necessary. Only in times of panic or during mortal combat would the entire reserves be consumed.

20. The primary purpose of the passage is to
    (A) refute a misconception about anaerobic glycolysis
    (B) introduce a new hypothesis about anaerobic glycolysis
    (C) describe the limitations of anaerobic glycolysis
    (D) analyze the chemistry of anaerobic glycolysis and its similarity to oxidative metabolism
    (E) explain anaerobic glycolysis and its effects on animal survival

21. According to the author, glycogen is crucial to the process of anaerobic glycolysis because glycogen
    (A) increases the organism's need for ATP
    (B) reduces the amount of ATP in the tissues
    (C) is an inhibitor of the oxidative metabolic production of ATP
    (D) ensures that the synthesis of ATP will occur speedily
    (E) is the material from which ATP is derived

22. According to the author, a major limitation of anaerobic glycolysis is that it can
    (A) produce in large animals more lactic acid than the liver can safely reconvert
    (B) necessitate a dangerously long recovery period in large animals
    (C) produce energy more slowly than it can be used by large animals
    (D) consume all of the available glycogen regardless of need
    (E) reduce significantly the rate at which energy is produced by oxidative metabolism

GO ON TO THE NEXT PAGE.

23. The passage suggests that the total anaerobic energy reserves of a vertebrate are proportional to the vertebrate's size because

(A) larger vertebrates conserve more energy than smaller vertebrates
(B) larger vertebrates use less oxygen per unit weight than smaller vertebrates
(C) the ability of a vertebrate to consume food is a function of its size
(D) the amount of muscle tissue in a vertebrate is directly related to its size
(E) the size of a vertebrate is proportional to the quantity of energy it can utilize

24. The author suggests that, on the basis of energy production, a 100-ton dinosaur would have been markedly vulnerable to which of the following?

I. Repeated attacks by a single smaller, more active adversary
II. Sustained attack by numerous smaller, more active adversaries
III. An attack by an individual adversary of similar size

(A) II only
(B) I and II only
(C) I and III only
(D) II and III only
(E) I, II, and III

25. It can be inferred from the passage that the time required to replenish muscle glycogen following anaerobic glycolysis is determined by which of the following factors?

I. Rate of oxidative metabolism
II. Quantity of lactic acid in the body fluids
III. Percentage of glucose that is returned to the muscles

(A) I only
(B) III only
(C) I and II only
(D) I and III only
(E) I, II, and III

26. The author is most probably addressing which of the following audiences?

(A) College students in an introductory course on animal physiology
(B) Historians of science investigating the discovery of anaerobic glycolysis
(C) Graduate students with specialized training in comparative anatomy
(D) Zoologists interested in prehistoric animals
(E) Biochemists doing research on oxidative metabolism

27. Which of the following best states the central idea of the passage?

(A) The disadvantage of a low oxidative metabolic rate in large animals can be offset by their ability to convert substantial amounts of glycogen into energy.
(B) The most significant problem facing animals that have used anaerobic glycolysis for energy is the resynthesis of its by-product, glucose, into glycogen.
(C) The benefits to animals of anaerobic glycolysis are offset by the profound costs that must be paid.
(D) The major factor ensuring that a large animal will triumph over a smaller animal is the large animal's ability to produce energy via anaerobic glycolysis.
(E) The great differences that exist in metabolic rates between species of small animals and species of large animals can have important effects on the patterns of their activities.

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. FLUSTERED: (A) mute (B) calm (C) heavy (D) ingrained (E) courageous

29. ENDORSE: (A) provoke criticism (B) receive payment (C) submit unwillingly (D) oppose publicly (E) perform quickly

30. EXPIRE: (A) evolve (B) stabilize (C) come to life (D) grow to fruition (E) bring to light

31. METAMORPHOSIS:
(A) relief from strain
(B) continuation without change
(C) cyclical motion
(D) dogmatic persistence
(E) varied activity

32. MOROSE: (A) overawed (B) agitated (C) cherubic (D) decisive (E) cheerful

33. INDELIBILITY: (A) availability (B) comprehensibility (C) decidability (D) erasability (E) retractability

34. SPIRITUAL: (A) eclectic (B) figurative (C) ephemeral (D) immoral (E) corporeal

35. DISPATCH: (A) serenity (B) leisureliness (C) heedlessness (D) irregularity (E) aversion

36. FERMENT: (A) solidity (B) purity (C) lucidity (D) transparency (E) tranquillity

37. FACETIOUS: (A) lugubrious (B) contentious (C) ingenuous (D) prodigious (E) audacious

38. CRAVEN: (A) indifferent (B) presumptuous (C) valorous (D) scrupulous (E) petulant

SECTION 2
Time—30 minutes
38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. The spellings of many Old English words have been ------- in the living language, although their pronunciations have changed.

   (A) preserved (B) shortened
   (C) preempted (D) revised (E) improved

2. The sheer diversity of tropical plants represents a seemingly ------- source of raw materials, of which only a few have been utilized.

   (A) exploited (B) quantifiable
   (C) controversial (D) inexhaustible
   (E) remarkable

3. For centuries animals have been used as ------- for people in experiments to assess the effects of therapeutic and other agents that might later be used in humans.

   (A) benefactors (B) companions
   (C) examples (D) precedents
   (E) surrogates

4. Social tensions among adult factions can be ------- by politics, but adolescents and children have no such ------- for resolving their conflict with the exclusive world of adults.

   (A) intensified..attitude
   (B) complicated..relief
   (C) frustrated..justification
   (D) adjusted..mechanism
   (E) revealed..opportunity

5. The state is a network of exchanged benefits and beliefs, ------- between rulers and citizens based on those laws and procedures that are ------- to the maintenance of community.

   (A) a compromise..inimical
   (B) an interdependence..subsidiary
   (C) a counterpoint..incidental
   (D) an equivalence..prerequisite
   (E) a reciprocity..conducive

6. Far from viewing Jefferson as a skeptical but enlightened intellectual, historians of the 1960's portrayed him as ------- thinker, eager to fill the young with his political orthodoxy while censoring ideas he did not like.

   (A) an adventurous (B) a doctrinaire
   (C) an eclectic (D) a judicious
   (E) a cynical

7. To have true disciples, a thinker must not be too -------: any effective intellectual leader depends on the ability of other people to ------- thought processes that did not originate with them.

   (A) popular..dismiss
   (B) methodical..interpret
   (C) idiosyncratic..reenact
   (D) self-confident..revitalize
   (E) pragmatic..discourage

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. ADULT:CHILD :: (A) horse:mare
(B) cat:kitten (C) swine:sow
(D) human:animal (E) cow:herd

9. CLOT:DISSOLVED ::
(A) enthusiast:influenced
(B) cartoon:distorted
(C) crowd:dispersed
(D) chain:disengaged
(E) disciple:inspired

10. GLOSSARY:TEXT ::
(A) bibliography:source
(B) abstract:dissertation
(C) legend:map
(D) index:catalog
(E) abbreviation:footnote

11. FERVOR:ZEALOT ::
(A) antipathy:philanthropist
(B) improvidence:spendthrift
(C) concision:politician
(D) determination:ecologist
(E) nonchalance:acrobat

12. SHARD:POTTERY :: (A) flint:stone
(B) flange:wheel (C) cinder:coal
(D) fragment:bone (E) tare:grain

13. FERTILIZE:GROW :: (A) immunize:resist
(B) nourish:enrich (C) heat:burn
(D) graft:multiply (E) prune:dwarf

14. ATTENTIVE:OFFICIOUS ::
(A) doubtful:ambiguous
(B) absorbed:engrossed
(C) refined:snobbish
(D) magisterial:authoritative
(E) impromptu:spontaneous

15. EXORBITANT:MODERATION ::
(A) dispassionate:equanimity
(B) macabre:interest
(C) perfidious:loyalty
(D) brilliant:gullibility
(E) lavish:extravagance

16. BLANDISHMENT:COAX ::
(A) medal:honor (B) budget:save
(C) diary:reminisce (D) concert:play
(E) plea:threaten

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

The dark regions in the starry night sky are not pockets in the universe that are devoid of stars as had long been thought. Rather, they are dark because of interstellar dust that hides the stars behind it. Although its visual effect is so pronounced, dust is only a minor constituent of the material, extremely low in density, that lies between the stars. Dust accounts for about one percent of the total mass of interstellar matter. The rest is hydrogen and helium gas, with small amounts of other elements. The interstellar material, rather like terrestrial clouds, comes in all shapes and sizes. The average density of interstellar material in the vicinity of our Sun is 1,000 to 10,000 times less than the best terrestrial laboratory vacuum. It is only because of the enormous interstellar distances that so little material per unit of volume becomes so significant. Optical astronomy is most directly affected, for although interstellar gas is perfectly transparent, the dust is not.

17. According to the passage, which of the following is a direct perceptual consequence of interstellar dust?
    (A) Some stars are rendered invisible to observers on Earth.
    (B) Many visible stars are made to seem brighter than they really are.
    (C) The presence of hydrogen and helium gas is revealed.
    (D) The night sky appears dusty at all times to observers on Earth.
    (E) The dust is conspicuously visible against a background of bright stars.

18. It can be inferred from the passage that the density of interstellar material is
    (A) higher where distances between the stars are shorter
    (B) equal to that of interstellar dust
    (C) unusually low in the vicinity of our Sun
    (D) independent of the incidence of gaseous components
    (E) not homogeneous throughout interstellar space

19. It can be inferred from the passage that it is because space is so vast that
    (A) little of the interstellar material in it seems substantial
    (B) normal units of volume seem futile for measurements of density
    (C) stars can be far enough from Earth to be obscured even by very sparsely distributed matter
    (D) interstellar gases can, for all practical purposes, be regarded as transparent
    (E) optical astronomy would be of little use even if no interstellar dust existed

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In his 1976 study of slavery in the United States, Herbert Gutman, like Fogel, Engerman, and Genovese, has rightly stressed the slaves' achievements. But unlike these historians, Gutman gives plantation owners little credit for these achievements. Rather, Gutman argues that one must look to the Black family and the slaves' extended kinship system to understand how crucial achievements, such as the maintenance of a cultural heritage and the development of a communal consciousness, were possible. His findings compel attention.

Gutman recreates the family and extended kinship structure mainly through an ingenious use of what any historian should draw upon, quantifiable data, derived in this case mostly from plantation birth registers. He also uses accounts of ex-slaves to probe the human reality behind his statistics. These sources indicate that the two-parent household predominated in slave quarters just as it did among freed slaves after emancipation. Although Gutman admits that forced separation by sale was frequent, he shows that the slaves' preference, revealed most clearly on plantations where sale was infrequent, was very much for stable monogamy. In less conclusive fashion Fogel, Engerman, and Genovese had already indicated the predominance of two-parent households; however, only Gutman emphasizes the preference for stable monogamy and points out what stable monogamy meant for the slaves' cultural heritage. Gutman argues convincingly that the stability of the Black family encouraged the transmission of—and so was crucial in sustaining—the Black heritage of folklore, music, and religious expression from one generation to another, a heritage that slaves were continually fashioning out of their African and American experiences.

Gutman's examination of other facets of kinship also produces important findings. Gutman discovers that cousins rarely married, an exogamous tendency that contrasted sharply with the endogamy practiced by the plantation owners. This preference for exogamy, Gutman suggests, may have derived from West African rules governing marriage, which, though they differed from one tribal group to another, all involved some kind of prohibition against unions with close kin. This taboo against cousins' marrying is important, argues Gutman, because it is one of many indications of a strong awareness among slaves of an extended kinship network. The fact that distantly related kin would care for children separated from their families also suggests this awareness. When blood relationships were few, as in newly created plantations in the Southwest, "fictive" kinship arrangements took their place until a new pattern of consanguinity developed. Gutman presents convincing evidence that this extended kinship structure—which he believes developed by the mid-to-late eighteenth century—provided the foundations for the strong communal consciousness that existed among slaves.

In sum, Gutman's study is significant because it offers a closely reasoned and original explanation of some of the slaves' achievements, one that correctly emphasizes the resources that slaves themselves possessed.

20. According to the passage, Fogel, Engerman, Genovese, and Gutman have all done which of the following?

    I. Discounted the influence of plantation owners on slaves' achievements.
    II. Emphasized the achievements of slaves.
    III. Pointed out the prevalence of the two-parent household among slaves.
    IV. Showed the connection between stable monogamy and slaves' cultural heritage.

    (A) I and II only
    (B) I and IV only
    (C) II and III only
    (D) I, III, and IV only
    (E) II, III, and IV only

21. With which of the following statements regarding the resources that historians ought to use would the author of the passage be most likely to agree?

    (A) Historians ought to make use of written rather than oral accounts.
    (B) Historians should rely primarily on birth registers.
    (C) Historians should rely exclusively on data that can be quantified.
    (D) Historians ought to make use of data that can be quantified.
    (E) Historians ought to draw on earlier historical research but they should do so in order to refute it.

GO ON TO THE NEXT PAGE.

22. Which of the following statements about the formation of the Black heritage of folklore, music, and religious expression is best supported by the information presented in the passage?

(A) The heritage was formed primarily out of the experiences of those slaves who attempted to preserve the stability of their families.
(B) The heritage was not formed out of the experiences of those slaves who married their cousins.
(C) The heritage was formed more out of the African than out of the American experiences of slaves.
(D) The heritage was not formed out of the experiences of only a single generation of slaves.
(E) The heritage was formed primarily out of slaves' experiences of interdependence on newly created plantations in the Southwest.

23. It can be inferred from the passage that, of the following, the most probable reason why a historian of slavery might be interested in studying the type of plantations mentioned in line 25 is that this type would

(A) give the historian access to the most complete plantation birth registers
(B) permit the historian to observe the kinship patterns that had been most popular among West African tribes
(C) provide the historian with evidence concerning the preference of freed slaves for stable monogamy
(D) furnish the historian with the opportunity to discover the kind of marital commitment that slaves themselves chose to have
(E) allow the historian to examine the influence of slaves' preferences on the actions of plantation owners

24. According to the passage, all of the following are true of the West African rules governing marriage mentioned in lines 46-50 EXCEPT:

(A) The rules were derived from rules governing fictive kinship arrangements.
(B) The rules forbade marriages between close kin.
(C) The rules are mentioned in Herbert Gutman's study.
(D) The rules were not uniform in all respects from one West African tribe to another.
(E) The rules have been considered to be a possible source of slaves' marriage preferences.

25. Which of the following statements concerning the marriage practices of plantation owners during the period of Black slavery in the United States can most logically be inferred from the information in the passage?

(A) These practices began to alter sometime around the mid-eighteenth century.
(B) These practices varied markedly from one region of the country to another.
(C) Plantation owners usually based their choice of marriage partners on economic considerations.
(D) Plantation owners often married earlier than slaves.
(E) Plantation owners often married their cousins.

26. Which of the following best describes the organization of the passage?

(A) The author compares and contrasts the work of several historians and then discusses areas for possible new research.
(B) The author presents his thesis, draws on the work of several historians for evidence to support his thesis, and concludes by reiterating his thesis.
(C) The author describes some features of a historical study and then uses those features to put forth his own argument.
(D) The author summarizes a historical study, examines two main arguments from the study, and then shows how the arguments are potentially in conflict with one another.
(E) The author presents the general argument of a historical study, describes the study in more detail, and concludes with a brief judgment of the study's value.

27. Which of the following is the most appropriate title for the passage, based on its content?

(A) The Influence of Herbert Gutman on Historians of Slavery in the United States
(B) Gutman's Explanation of How Slaves Could Maintain a Cultural Heritage and Develop a Communal Consciousness
(C) Slavery in the United States: New Controversy About an Old Subject
(D) The Black Heritage of Folklore, Music, and Religious Expression: Its Growing Influence
(E) The Black Family and Extended Kinship Structure: How They Were Important for the Freed Slave

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. ACCELERATE: (A) swerve (B) arouse (C) dispel (D) reject (E) retard

29. JABBER: (A) tickle (B) argue (C) stroke (D) speak slowly (E) joke inaptly

30. WARMONGER: (A) commentator (B) liaison (C) lobbyist (D) emissary (E) pacifist

31. FLUENT: (A) insensitive (B) inappropriate (C) derogatory (D) halting (E) hypocritical

32. DISSONANCE: (A) concord (B) confederacy (C) collusion (D) consent (E) contract

33. SAVANT:
(A) flatterer
(B) bore
(C) unlearned person
(D) unprincipled individual
(E) misunderstood advisor

34. BREACH: (A) garner (B) solder (C) keep silent (D) move forward (E) give approval

35. TORTUOUS: (A) enduring (B) informal (C) cautious (D) simplistic (E) straightforward

36. PLETHORA: (A) vacuousness (B) narrowness (C) choice (D) dearth (E) confusion

37. POSTURE: (A) walk clumsily (B) behave naturally (C) impose arbitrarily (D) publicize widely (E) explain carefully

38. GOSSAMER: (A) sincere (B) taciturn (C) intense (D) awkward (E) ponderous

SECTION 3

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

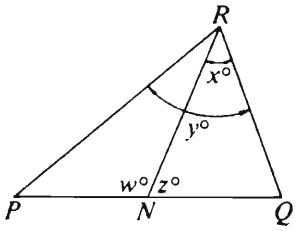
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

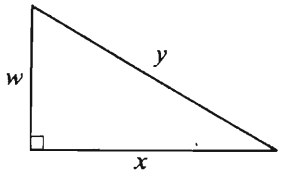


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	The average (arithmetic mean) of 10, 20, and 30	The average (arithmetic mean) of 12, 20, and 28



2.	x^2	y^2

$x = -7$

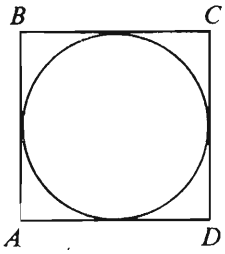
3.	$7 - x$	$x - 7$

4.	$\frac{\sqrt{60}}{\sqrt{15}}$	4

$x^2 + y^2 = 81$
$x^2 - y^2 = 0$

5.	$x^4 - y^4$	0

	Column A	Column B



The diameter of the inscribed circle is 2.

6.	The perimeter of square $ABCD$	2π

$x > 1$

7.	2^x	x^2

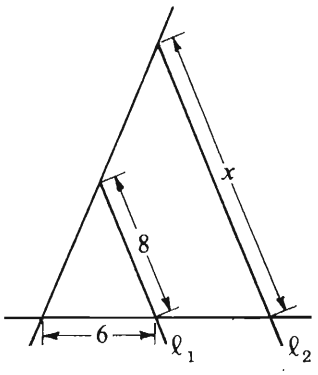
The price of an article of clothing was reduced from \$25 to \$20. The reduced price of the article was then increased by x percent to return it to \$25.

8.	x	20

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B



$\ell_1 \parallel \ell_2$

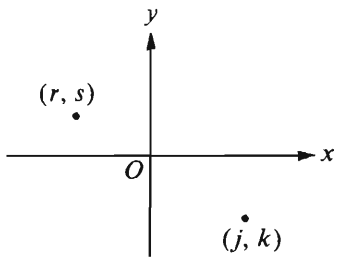
9.	x	14

10.	$4.1 + \frac{1}{3}$	$5.1 - \frac{2}{3}$

$y \neq 5$

11.	$(5 - y)(y - 5)$	0

	Column A	Column B



12.	$s + j$	$r + k$

$\frac{5}{8}, \frac{1}{3}, \frac{4}{7}, \frac{3}{10}$

13.	The greatest of the four fractions given above	The sum of 0.325 and the least of the four fractions given above

14.	x is an integer, and the remainder when $2x$ is divided by 4 is 0.	
	The remainder when x is divided by 4	0

r, s, and t are the radii of three circular regions that have areas R, S, and T, respectively.

$R = 2S$ and $S = 2T$

15.	r	$2t$

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

---

16. If $2x + 3y = 15$ and $y = 1$, then $2x =$

(A) 18 (B) 12 (C) 10 (D) 9 (E) 3

17. If a small juice can contains 200 milliliters of juice, how many liters of juice are there in a case containing 48 small cans? (1 liter = 1,000 milliliters)

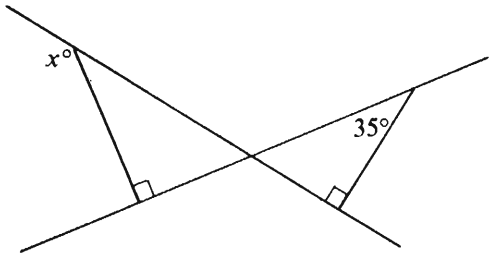
(A) 0.96 (B) 9.6 (C) 96
(D) 960 (E) 9,600

18. If $\frac{32}{x} - 6 = 2$, then $x =$

(A) -8 (B) -4 (C) 4 (D) 6 (E) 8

19. $(3 \times 100) + (4 \times 1) + (5 \times 1{,}000) + (6 \times 10) =$

(A) 3,456
(B) 3,564
(C) 4,635
(D) 5,346
(E) 5,364



20. In the figure above, $x =$

(A) 35 (B) 55 (C) 125
(D) 145 (E) 150

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following data.

SPEED OF WINDS IN THE UNITED STATES

(miles per hour)

Station	Up to and Including 1967 Average	Up to and Including 1967 High	Up to and Including 1979 Average	Up to and Including 1979 High
Atlanta, Ga.	9.2	70	9.1	70
Boston, Mass.	13.0	65	12.6	65
Buffalo, N.Y.	12.6	91	12.3	91
Chicago, Ill.	10.2	60	10.4	60
Cincinnati, Ohio	7.1	49	7.1	49
Denver, Colo.	9.3	56	9.0	56
Helena, Mont.	7.9	73	7.9	73
Miami, Fla.	9.0	132	9.2	132
Montgomery, Ala.	6.9	60	6.7	72
Mt. Washington, N.H.	35.6	231	35.0	231
New York, N.Y.	9.6	70	9.4	70
Omaha, Nebr.	11.1	73	10.8	109
Pittsburgh, Pa.	9.4	58	9.3	58
Salt Lake City, Utah	8.7	71	8.8	71
San Diego, Calif.	6.5	51	6.7	51
Washington, D.C.	9.5	78	9.3	78

SPEED AND OFFICIAL DESIGNATIONS OF WINDS

Designation	Miles per Hour	Designation	Miles per Hour	Designation	Miles per Hour	Designation	Miles per Hour
Calm	Less than 1	Moderate breeze	13 to 18	Near gale	32 to 38	Storm	55 to 63
Light air	1 to 3	Fresh breeze	19 to 24	Gale	39 to 46	Violent storm	64 to 73
Light breeze	4 to 7	Strong breeze	25 to 31	Strong gale	47 to 54	Hurricane	74 and above
Gentle breeze	8 to 12						

GO ON TO THE NEXT PAGE.

21. Through 1967 what was the ratio of the highest to the average wind speed for Boston, Massachusetts?

(A) 5:1 (B) 6:1 (C) 7:1
(D) 8:1 (E) 9:1

22. For the three places whose average wind speeds through 1979 were the three highest, approximately what was the average (arithmetic mean) of those wind speeds in miles per hour?

(A) 157
(B) 151
(C) 60
(D) 20
(E) 12

23. For how many of the places shown did the highest wind speed change from 1967 to 1979?

(A) One (B) Two (C) Three
(D) Six (E) Fourteen

24. For which of the places shown was the absolute value of the difference between the average wind speed through 1967 and the average wind speed through 1979 greatest?

(A) Boston
(B) Chicago
(C) Mt. Washington
(D) Omaha
(E) San Diego

25. The data infers that, between December 31, 1967 and January 1, 1980, which of the following was true?

I. There was a hurricane wind recorded in Omaha.
II. The average wind speed in Montgomery was 6.8 miles per hour.
III. The wind speed in Chicago was never as high as 60 miles per hour.

(A) I only (B) II only (C) I and III only
(D) II and III only (E) I, II, and III

GO ON TO THE NEXT PAGE.

26. Ricardo lives 4 kilometers due west of Pat's house. Ann lives 6 kilometers due north of Pat's house and 4 kilometers due west of David's house. What is the straight-line distance, in kilometers, from Ricardo's house to David's house?

(A) 4
(B) 5
(C) 8
(D) 10
(E) 12

27. Of the following, which is most nearly equal to $\frac{2}{3}$?

(A) $\frac{3}{4}$ (B) $\frac{5}{6}$ (C) $\frac{7}{9}$ (D) $\frac{11}{15}$ (E) $\frac{15}{21}$

28. If a certain object has been moving at the constant rate of x meters per minute, how many meters has the object moved in the last y seconds?

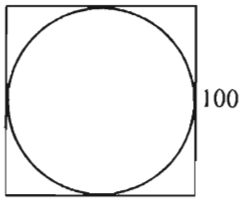
(A) $\frac{xy}{60}$

(B) $\frac{60x}{y}$

(C) $\frac{x}{60y}$

(D) $\frac{60}{xy}$

(E) $60xy$



29. In the figure above, the circle is inscribed in the square. If the square has side of length 100, then the perimeter of the square is approximately how much greater than the circumference of the circle?

(A) 9,686 (B) 2,150 (C) 243
(D) 100 (E) 86

30. One month Mary used $\frac{1}{6}$ of her monthly salary for a car payment and $\frac{1}{4}$ more than the car payment for rent. What fraction of her monthly salary did Mary use that month for the car payment and rent combined?

(A) $\frac{5}{24}$

(B) $\frac{3}{8}$

(C) $\frac{5}{12}$

(D) $\frac{1}{2}$

(E) $\frac{7}{12}$

SECTION 4

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

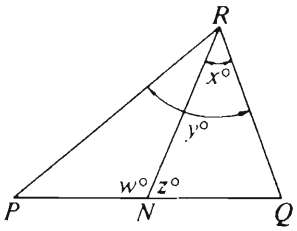
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

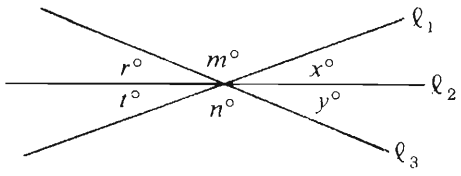
GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	Maria is 50 inches tall. Her coat weighs 2 pounds.	
1.	The total number of pounds that Maria and her coat weigh	100

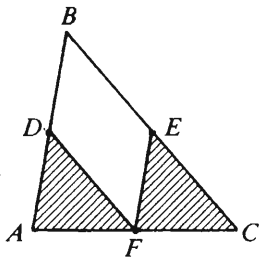
	$x + 4 = 10$	
2.	$x - 2$	$\frac{x}{2}$

	x percent of 24 is 12.	
3.	x	50



4.	$m - (x + y)$	$n - (r + t)$
5.	$(-1)^{10}$	$(-1)^{11}$

	Column A	Column B
	$7x^2 = 21$	
6.	x	2



D, E, and F are midpoints of the sides of $\triangle ABC$ as shown

7.	The sum of the areas of the shaded regions	The area of the region enclosed by quadrilateral $DBEF$

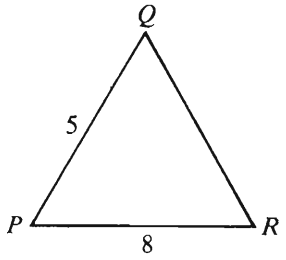
	$b = 2a + 1$	
8.	$2b$	$4a + 1$

	$n = 7 \cdot 19^3$	
9.	The number of distinct positive factors of n	10

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B



10.	QR	6

$y^2 = x^2 - 1$ and $x \neq 0$.

11.	y^4	$x^4 + 1$

The length of an edge of cube R is 2 and the length of an edge of cube T is 3.

12.	The ratio of the surface area of cube R to that of cube T	The ratio of the volume of cube R to that of cube T

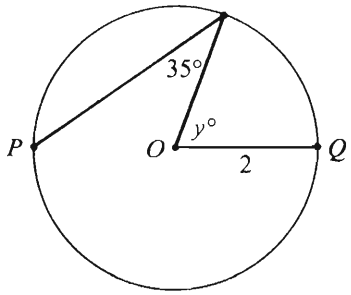
	Column A	Column B

Let $\boxed{x} = 3$, if x is an odd integer;

let $\boxed{x} = 6$, if x is an even integer.

r and s are integers, $3r$ is odd, and $5 + s$ is odd.

13.	$\boxed{r}$	$\boxed{s}$



O is the center of the circle. The distance between P and Q is 4.

14.	y	70

$xy = 1$ and $y - x = 0$

15.	y	1

GO ON TO THE NEXT PAGE.

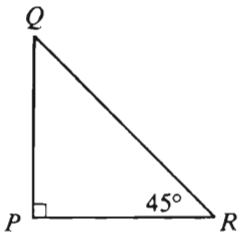
Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. If the sum of two numbers is 14 and their difference is 2, what is the product of the two numbers?

(A) 24
(B) 28
(C) 40
(D) 45
(E) 48

17. A secretary typed 6 letters, each of which had either 1 or 2 pages. If the secretary typed 10 pages in all, how many of the letters had 2 pages?

(A) 1
(B) 2
(C) 3
(D) 4
(E) 5



18. If the area of $\triangle PQR$ above is 32, what is the length of PR?

(A) 2 (B) 7 (C) 8 (D) 16 (E) 32

19. If $\frac{3}{x} + \frac{4}{3x} = \frac{1}{3}$, then $x =$

(A) 7
(B) 9
(C) 11
(D) 13
(E) 15

20. $\dfrac{\frac{4}{9} + \frac{4}{9} + \frac{4}{9} + \frac{4}{9} + \frac{4}{9} + \frac{4}{9}}{6} =$

(A) $\frac{2}{27}$ (B) $\frac{4}{9}$ (C) $\frac{2}{3}$ (D) $\frac{8}{3}$ (E) 6

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following table.

CONSUMER COMPLAINTS RECEIVED BY THE CIVIL AERONAUTICS BOARD

Category	1980 (percent)	1981 (percent)
Flight problems	20.0%	22.1%
Baggage	18.3	21.8
Customer service	13.1	11.3
Oversales of seats	10.5	11.8
Refund problems	10.1	8.1
Fares	6.4	6.0
Reservations and ticketing	5.8	5.6
Tours	3.3	2.3
Smoking	3.2	2.9
Advertising	1.2	1.1
Credit	1.0	0.8
Special passengers	0.9	0.9
Other	6.2	5.3
	100.0%	100.0%
Total Number of Complaints	22,988	13,278

21. Approximately how many complaints concerning Credit were received by the Civil Aeronautics Board in 1980 ?

(A) 133 (B) 220 (C) 230
(D) 1,330 (E) 2,300

22. By approximately what percent did the total number of complaints decrease from 1980 to 1981 ?

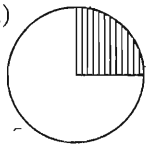
(A) 40%
(B) 60%
(C) 75%
(D) 100%
(E) 175%

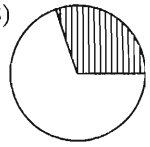
GO ON TO THE NEXT PAGE.

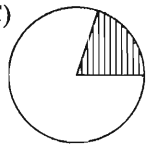
23. If the categories, except "Other," are ranked by percent of complaints from greatest to least, for how many of the categories would the rank change from 1980 to 1981 ?

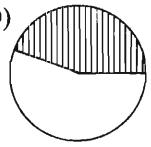
(A) Three (B) Four (C) Six
(D) Seven (E) Eight

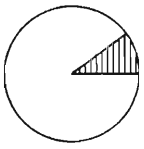
24. If the circle graphs below (drawn to scale) represent total consumer complaints for 1980, which graph shows a shaded sector that corresponds to Flight problems and Refund problems combined?

(A) 

(B) 

(C) 

(D) 

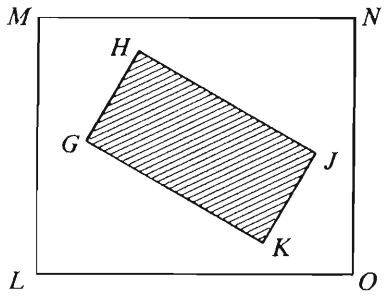
(E) 

25. Which of the following statements can be inferred from the table?

I. In 1980 and in 1981, complaints about Flight problems, Baggage, and Customer service together accounted for more than 50 percent of all consumer complaints received by the Civil Aeronautics Board.
II. The number of Special passenger complaints was unchanged from 1980 to 1981.
III. From 1980 to 1981 the number of Flight problem complaints increased by more than 2 percent.

(A) I only
(B) II only
(C) I and II only
(D) I and III only
(E) I, II, and III

GO ON TO THE NEXT PAGE.



26. In the figure above, $LMNO$ and $GHJK$ are rectangles where $GH = \frac{1}{2} LM$ and $HJ = \frac{1}{2} MN$. What fraction of the region bounded by $LMNO$ is NOT shaded?

(A) $\frac{1}{4}$ (B) $\frac{1}{3}$ (C) $\frac{1}{2}$ (D) $\frac{2}{3}$ (E) $\frac{3}{4}$

27. At 9:00 a.m. train T left the train station and two hours later train S left the same station on a parallel track. If train T averaged 60 kilometers per hour and train S averaged 75 kilometers per hour until S passed T, at what time did S pass T?

(A) 2:00 p.m.
(B) 5:00 p.m.
(C) 6:00 p.m.
(D) 7:00 p.m.
(E) 9:00 p.m.

28. By weight, liquid A makes up 7.0 percent of solution I and 14.5 percent of solution II. If 3 grams of solution I is mixed with 2 grams of solution II, then liquid A accounts for what percent of the weight of the resulting solution?

(A) 6.09% (B) 10% (C) 10.75%
(D) 21.5% (E) 50%

29. The volume of a cylindrical tank is directly proportional to the height and the square of the radius of the tank. If a certain tank with a radius of 10 centimeters has a volume of 20,000 cubic centimeters, what is the volume, in cubic centimeters, of a tank of the same height with a radius of 15 centimeters?

(A) 300,000
(B) 45,000
(C) 30,000
(D) 15,000
(E) 4,500

30. If $y = \frac{a}{a+b}$ and $x = \frac{a}{b}$, what is y in terms of x?

(A) $-\frac{1}{x}$

(B) $1 + x$

(C) $1 + \frac{1}{x}$

(D) $\frac{1}{1+x}$

(E) $\frac{x}{1+x}$

SECTION 5
Time—30 minutes
25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given

Questions 1-3

A student is planning his class schedule for the fall and spring semesters. He must take exactly three courses each semester. By the end of the spring semester, the student must complete at least three courses in Area F, at least one course in Area G, and at least one course in Area H. The only courses available to the student are:

Area F: F102, F201, F202, F203
Area G: G101, G102, G103, G201
Area H: H101, H102, H202

The selection of courses is subject to the following restrictions:

A student can take no more than two courses with the same letter designation per semester.
Courses with a number designation in the 200's are offered only in the spring semester; courses with a number designation in the 100's are offered in both the fall and spring semesters.
No course taken in the fall semester can be repeated in the spring semester.

1. Which of the following is a course that the student must take?
   (A) F102
   (B) G101
   (C) G102
   (D) H101
   (E) H102

2. Which of the following is a possible schedule for the spring semester?
   (A) F102, G101, and F202
   (B) F102, G101, and G102
   (C) F201, F202, and H102
   (D) G101, G102, and G201
   (E) G102, G201, and H101

3. If the student takes G101 and G102 in the fall, his spring schedule must include
   (A) F203
   (B) F201 and F202
   (C) G201
   (D) exactly one course from Area G
   (E) exactly one course from Area H

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4. Japanese factory workers are guaranteed lifetime jobs, bonuses paid on the basis of productivity and corporate profits, and a wage rate that is not attached to a particular job. Paradoxically, these guarantees do not discourage factory owners from introducing labor-saving machinery. Such innovations are to the factory owners' advantage despite the fact that the owners must protect the wages of their workers.

   Which of the following, if true, logically explains why the introduction of labor-saving machinery is advantageous to factory owners?

   (A) Before a Japanese factory worker is hired, he or she must present a record of his or her previous productivity.
   (B) Labor-saving machinery increases productivity, thus yielding profits that more than cover the cost of retraining workers for other jobs.
   (C) The purchase and maintenance of new machinery adds significantly to the final cost of the goods produced.
   (D) Factory workers demand a change of procedure in the routine tasks they perform.
   (E) Limited competition exists among Japanese factories for consumer markets.

5. Only a member of the Regionalist party would oppose the bill for a new recycling law that would protect the environment from industrial interests. Ellen cannot be a member of the Regionalist party because she supports the bill.

   Which of the following statements points out why the conclusion above is invalidly drawn?

   (A) Regionalist party members have organized to oppose industrial interests on several other issues.
   (B) Industrial interests need not oppose the protection of the environment.
   (C) Past attempts to protect the environment through recycling laws have failed.
   (D) It is possible that some Regionalist party members may not oppose the bill for a new recycling law.
   (E) Ellen has attended programs and distributed literature prepared by the Regionalist party.

6. Roberta was born in 1967, and so in 1976 she was nine years old. It is clear from this example that the last two digits of a person's birth year will be the same as the last two digits of the year of that person's ninth birthday, except that the position of the digits will be reversed.

   Which of the following is the best criticism of the assertions made above?

   (A) The generalization is valid only for those birth years that do not end in two zeroes.
   (B) The example does not exhibit the same principle as is expressed in the generalization based on it.
   (C) The generalization is valid only for those birth years in which the last digit is one greater than the second-to-last digit.
   (D) The example cannot be shown to be correct unless the truth of the generalization is already presupposed.
   (E) The generalization is valid only for those birth years in which the last digit is greater than five.

GO ON TO THE NEXT PAGE.

Questions 7-12

Two-way roads exist among the following towns surrounding a mountain:

Between M and N
Between M and O
Between O and R
Between R and T
Between R and U
Between T and P
Between P and S

There is also a one-way road between town P and town N; the permitted direction of travel is from P to N.
None of these roads intersect each other except at the towns.
There are no other towns or roads in the vicinity.
Bicycles must follow the direction established for general traffic on roads.

7. To bicycle from S to N by road, it is necessary to go to or through town

   (A) M (B) P (C) R (D) T (E) U

8. If a rock slide temporarily makes the road between O and R impassable, then in order to reach M by road from U, a bicyclist would have to go to or through a total of how many other towns besides M and U ?

   (A) 2 (B) 3 (C) 4 (D) 5 (E) 6

9. If a bridge on the road between M and O is washed out, making the road impassable, a bicyclist would NOT be able to go by road from

   (A) N to M
   (B) N to S
   (C) P to M
   (D) P to S
   (E) R to M

10. If a rock slide blocks a lane of the road from R to T, with the result that travel on the road can go only one way, from R to T, it will still be possible to go on a bicycle by road from P to

    (A) N and/or S but impossible to go to M, O, R, T, or U
    (B) N, S, and/or T but impossible to go to M, O, R, or U
    (C) M, N, O, and/or T but impossible to go to S, R, or U
    (D) M, O, R, S, and/or T but impossible to go to N or U
    (E) M, N, O, R, S, T, and/or U

11. Assume that one lane of the road from O to R is closed for repairs, with the result that travel on the road goes only one way, from R to O. It will then be possible to travel by road on a bicycle among any of the towns M, N, O, P, R, S, T, and U among which such travel was possible before the closing, if which of the following one-way temporary roads is constructed?

    (A) From M to U
    (B) From P to R
    (C) From S to R
    (D) From S to U
    (E) From T to U

12. If M is lower and T is higher on the mountain than any of the other towns in the vicinity and N, P, and R are all at the same altitude, the distance by road going from U to S will be shortened by building a two-way road along a level straight line between

    (A) R and N
    (B) R and M
    (C) P and M
    (D) P and R
    (E) T and N

GO ON TO THE NEXT PAGE.

Questions 13-17

A woman plans to plant exactly six kinds of herbs: oregano, sage, rosemary, parsley, marjoram, and thyme. She places six pots side by side in a straight line and numbers the pots consecutively from 1 to 6, left to right. She will plant only one kind of herb in each pot. The arrangement of the herbs is subject to the following conditions:

Oregano must be planted in some pot to the left of parsley.
Marjoram must be planted in some pot to the left of thyme.
Sage cannot be planted in pot 1.
Rosemary must be planted next to oregano.

13. Which of the following arrangements of herbs from pot 1 through 6, respectively, conforms to the conditions above?
    (A) Thyme, oregano, rosemary, marjoram, parsley, sage
    (B) Sage, marjoram, thyme, rosemary, oregano, parsley
    (C) Marjoram, sage, thyme, parsley, rosemary, oregano
    (D) Oregano, parsley, marjoram, thyme, sage, rosemary
    (E) Rosemary, oregano, marjoram, sage, parsley, thyme

14. If sage is planted in some pot to the right of parsley, which of the following must be true?
    (A) Sage is planted in some pot to the right of oregano.
    (B) Sage is planted in some pot to the right of marjoram.
    (C) Sage is planted in some pot to the right of thyme.
    (D) Parsley is planted in some pot to the left of marjoram.
    (E) Parsley is planted in some pot to the left of rosemary.

15. If thyme is planted in some pot to the left of oregano, which of the following must be true?
    (A) Thyme is planted in some pot to the left of sage.
    (B) Thyme is planted in some pot to the left of rosemary.
    (C) Oregano is planted in some pot to the left of sage.
    (D) Oregano is planted in some pot to the left of rosemary.
    (E) Oregano is planted in some pot to the left of marjoram.

16. If parsley is planted in some pot to the left of marjoram, marjoram could be planted in which of the following pots?
    (A) 1 (B) 2 (C) 3 (D) 4 (E) 6

17. If oregano is planted next to thyme, which of the following must be true?
    (A) Marjoram is planted in pot 1.
    (B) Sage is planted in pot 2.
    (C) Rosemary is planted in pot 3.
    (D) Oregano is planted in pot 4.
    (E) Thyme is planted in pot 5.

GO ON TO THE NEXT PAGE.

Questions 18-22

In a certain target-shooting game, a team must shoot at seven targets. Exactly one shot is allowed for shooting at each target. The targets are numbered in consecutive order from 1 to 7. The game is being played by a three-member team consisting of players S, T, and U, who must observe the following rules:

The seven targets must be shot at in consecutive order, starting with target 1.
Both S and U can shoot at odd-numbered and even-numbered targets.
T cannot shoot at even-numbered targets.
S and T must each shoot at no fewer than two targets.
U must take exactly one shot.
S cannot take three consecutive shots.

18. If all team members take exactly their required minimum number of shots before any team member takes an additional shot, then the next target to be shot at in the game after the required minimum of shots is target

(A) 3 (B) 4 (C) 5 (D) 6 (E) 7

19. If T takes the same total number of shots during the game as one other team member, then which of the following is true?

(A) S must shoot at even-numbered targets only.
(B) T must shoot at all of the odd-numbered targets.
(C) U must shoot at an odd-numbered target.
(D) S and U must each shoot at exactly one odd-numbered target.
(E) Either S or U, but not both, must shoot at exactly one odd-numbered target.

20. If all odd-numbered but no even-numbered targets are hit during the game, then all of the following are possible total numbers of hits for each player at the end of the game EXCEPT

(A) S = 2; T = 1; U = 1
(B) S = 1; T = 2; U = 1
(C) S = 0; T = 3; U = 1
(D) S = 2; T = 2; U = 0
(E) S = 1; T = 3; U = 0

21. If, during the game, S and T each hit exactly half of the targets that each shoots at, then the lowest possible total number of hits that the team could make in the game is

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

22. There is one and only one of the seven targets that U can shoot at during the game if the team agrees in advance that

(A) S will shoot at exactly four targets
(B) S will shoot at targets 2, 4, and 6 only
(C) T will take exactly three shots
(D) T will shoot at targets 1 and 7 only
(E) T will shoot at targets 3 and 5 only

GO ON TO THE NEXT PAGE.

23. A small dose of widely used tranquilizer allows people to lie during lie detector tests without being discovered. The stress responses that lie detector tests measure can be inhibited by the drug without noticeable side effects. One of the implications of this fact is that the drug can also be effective in reducing stress in everyday situations.

An assumption of the passage is that

(A) tranquilizers are always an effective treatment for stress
(B) the inhibition of stress responses increases subjective stress
(C) stress as measured by a lie detector is similar to everyday stress
(D) persons who lie during a lie detector test always display signs of stress
(E) it is not desirable to reduce stress in everyday situations

24. The attitude that it is all right to do what harms no one but oneself is usually accompanied by a disregard for the actual interdependence of people. Destroying one's own life or health means not being available to help family members or the community; it means, instead, absorbing the limited resources of the community for food, health services, and education without contributing fully to the community.

Which of the following, if true, most strongly supports the view expressed above?

(A) The cost of avoidable accidents and illnesses raises health insurance rates for everyone.
(B) Harm to one person can result in an indirect benefit, such as the availability of work in health-related fields, to others.
(C) Life would be dull if it were necessary to abstain from all of the minor pleasures that entail some risk of harm to a person who indulges in them.
(D) The contribution a person makes to the community cannot be measured by that person's degree of health.
(E) The primary damage caused by the consumption of alcohol, tobacco, and unauthorized drugs is done to the person who uses those substances.

25. Superficially, college graduates in 1982 resemble college graduates of 1964; they are fairly conservative, well dressed, and interested in tradition; they respect their parents. But there is a deep-seated difference: a majority of the members of the class of 1982 who were surveyed in their freshman year stated that making a good income was an important reason for their decision to go to college.

The statements in the passage above, if true, best support which of the following conclusions?

(A) The concerns of college graduates of 1964 were superficial compared to the financial worries of college graduates of 1982.
(B) Fewer than half the students of the class of 1964 declared as freshmen that they entered college in order to increase their earning potential.
(C) Educational background did not play as significant a part in determining income in 1964 as it does in 1982.
(D) A majority of the members of the class of 1964 revised their reasons for attending college between their freshman year and college graduation.
(E) College graduates of 1964 were actually less conservative than college graduates of 1982.

SECTION 6

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-5

Access to the XRT computer's data sets is obtained by entering job names into the computer. Each job name must consist of a three-word sequence that conforms to the following rules:

Each word must consist of three, five, or seven letters.
The letters R, T, and X must appear exactly once in each job name, not necessarily in that order.
The third word must contain more letters than the second word.
Each word must begin with a different letter.

1. Which of the following could be a job name for the XRT computer?

(A) AXE DIVER BOAST
(B) BOX ROAM NEVER
(C) CALLS EXERT WINDOWS
(D) EXPECT ONE PICTURE
(E) INCOME TAX RETURNS

2. If BOXER is the second word in a job name for the XRT computer, which of the following could be the first and third words, respectively?

(A) ARM, RUNNING
(B) BID, TAMES
(C) CAMPS, TRAINER
(D) DID, STEAMED
(E) FOX, RENTED

3. If EXTRA is the third word in a job name for the XRT computer, which of the following CANNOT be the second word?

(A) ACE
(B) BEE
(C) END
(D) FOE
(E) GUM

4. The sequence of words MOTHS, VEX, MAR is not a possible job name for the XRT computer. Which of the following procedures if performed on the sequence produces a sequence that could be a job name for the XRT computer?

(A) Reversing the order of the letters in a specific word and removing a specific letter from the longest word
(B) Reversing the order of the letters in a specific word and reversing the order of the three words
(C) Reversing the order of the letters in a specific word
(D) Reversing the order of the three words
(E) Removing a specific letter from the longest word

5. How many letters can the second words in job names for the XRT computer have?

(A) Three, but they cannot have five or seven
(B) Five, but they cannot have three or seven
(C) Seven, but they cannot have three or five
(D) Three or five, but they cannot have seven
(E) Five or seven, but they cannot have three

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6. Experienced pilots often have more trouble than novice pilots in learning to fly the newly developed ultralight airplanes. Being accustomed to heavier aircraft, experienced pilots, when flying ultralight craft, seem not to respect the wind as much as they should.

   The passage implies that the heavier aircraft mentioned above are

   (A) harder to land than ultralight aircraft
   (B) not as popular with pilots as ultralight aircraft
   (C) not as safe as ultralight aircraft
   (D) more fuel-efficient than ultralight aircraft
   (E) easier to handle in wind than ultralight aircraft

7. One of the truisms of the advertising industry is that it is rarely necessary to say something of substance in an advertisement in order to boost sales. Instead, one only needs to attract the potential customer's attention; memory does the rest, for it is more important for sales that people know of a product than that they know something about it.

   Which of the following is implied by the passage above?

   (A) People can remember a product without having much information about it.
   (B) Advertisements, in their own way, function to improve people's memories.
   (C) Attracting a potential customer's attention is a simple matter.
   (D) The advertising industry knows little of substance about the products it promotes.
   (E) Advertisements seldom tell the truth about a product.

8. Spiritualism, the doctrine that it is possible to communicate with the spirits of the deceased through specially talented persons called mediums, is fraudulent. As long ago as the 1870's, Professor Edwin Lankester showed that the purported "spirit writing" of the famed medium Henry Slade was present on a slate before the "spirits" were supposed to have begun writing on it. This example demonstrates that the doctrine of spiritualism is worthless.

   If the example above is correctly reported, which of the following is the best argument against the conclusion drawn above?

   (A) There cannot be proof that the spirits of the deceased do not exist.
   (B) The conclusion depends on a historical report, and such reports of past events do not recount all of the circumstances.
   (C) The cited evidence presupposes what is to be proved.
   (D) A single instance of fraud cannot show that the doctrine is false in general.
   (E) The correctness of the report depends on the veracity of antispiritualists, who may be expected to be biased.

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Questions 9-13

A shopkeeper is preparing gift boxes of candy. Each box will contain exactly two kinds of hard candy to be selected from F, G, and H, and exactly three kinds of soft candy to be selected from P, Q, R, S, and T, with the following restrictions:

G cannot be in the same gift box as T.
P cannot be in the same gift box as S.
Q cannot be in the same gift box as T.

9. If G is included in a gift box, which of the following is a kind of candy that must also be included?

(A) F (B) H (C) P (D) Q (E) S

10. If H is not included in a particular gift box, any of the following kinds of candies can be included EXCEPT

(A) P (B) Q (C) R (D) S (E) T

11. Which of the following kinds of candies must be included in each of the gift boxes?

(A) F (B) G (C) H (D) P (E) R

12. If T is included in a gift box, the box must also include which of the following kinds of candy?

(A) F and G
(B) F and H
(C) G and H
(D) P and R
(E) R and S

13. In a gift box that contains an acceptable assortment of candies, which of the following substitutions will always result in another acceptable assortment?

(A) P for S
(B) Q for R
(C) S for R
(D) T for P
(E) T for Q

GO ON TO THE NEXT PAGE.

Questions 14-18

A doctor has prescribed an exercise program for a patient. Choosing from exercises P, Q, R, S, T, U, V, and W, the patient must perform a routine of exactly five different exercises each day. In any day's routine, except the first, exactly three of the exercises must be ones that were included in the routine done on the previous day, and any permissible routine must also satisfy the following conditions:

If P is in a routine, V cannot be done in that routine.
If Q is in a routine, T must be one of the exercises done after Q in that routine.
If R is in a routine, V must be one of the exercises done after R in that routine.
The fifth exercise of any routine must be either S or U.

14. Which of the following could be the routine for the first day of the program?

(A) P, R, V, S, U
(B) Q, S, R, V, U
(C) T, U, R, V, S
(D) U, Q, S, T, W
(E) V, Q, R, T, S

15. If one day's routine is P, Q, W, T, U, each of the following could be the next day's routine EXCEPT

(A) Q, R, V, T, U
(B) Q, T, V, W, S
(C) W, R, V, T, U
(D) W, T, U, V, S
(E) W, T, S, P, U

16. Which of the following is true of any permissible routine?

(A) P cannot be done third.
(B) Q cannot be done third.
(C) T cannot be done third.
(D) R cannot be done fourth.
(E) U cannot be done fourth.

17. If the patient chooses R and W for the first day's routine, which of the following could be the other three exercises chosen?

(A) P, T, U
(B) Q, S, V
(C) Q, T, V
(D) T, S, U
(E) T, S, V

18. If R is the third exercise in a routine, which of the following CANNOT be the second exercise in that routine?

(A) Q (B) S (C) T (D) U (E) W

GO ON TO THE NEXT PAGE.

Questions 19-22

Six campers—Alice, Betty, Carmen, Dora, Gina, and Harriet—are arranging a dishwashing schedule for the six days of their camping trip so that each of them will wash dishes on only one day.

Betty washes either on day 2 or on day 6.
If Alice washes on day 1, Carmen washes on day 4; Carmen does not wash on day 4 unless Alice washes on day 1.
If Alice washes on day 1, Harriet washes on day 5; Harriet does not wash on day 5 unless Alice washes on day 1.
If Gina does not wash on day 3, Alice washes on day 3.
If Alice washes on day 4, Dora washes on day 5.
If Betty washes on day 2, Gina washes on day 5.
If Harriet washes on day 6, Dora washes on day 4.

19. Which of the following is an acceptable order in which the campers can wash dishes from the first to the last day?

(A) Dora, Betty, Alice, Gina, Carmen, Harriet
(B) Betty, Alice, Harriet, Carmen, Gina, Dora
(C) Harriet, Gina, Betty, Carmen, Dora, Alice
(D) Carmen, Betty, Alice, Dora, Gina, Harriet
(E) Alice, Betty, Dora, Carmen, Gina, Harriet

20. If Dora washes on day 6, on which day does Carmen wash?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

21. If Alice washes on day 1, who washes on day 2?

(A) Betty
(B) Carmen
(C) Dora
(D) Gina
(E) Harriet

22. If Betty washes on day 2, which of the following is a complete and accurate list of the days that could be the day on which Harriet washes?

(A) 1
(B) 4
(C) 1, 4
(D) 4, 6
(E) 1, 4, 6

GO ON TO THE NEXT PAGE.

23. Some would have you believe that the economic problems of Western Europe have been caused by the Organization of Petroleum Exporting Countries (OPEC) oil cartel. This is nonsense. After all, Great Britain is not dependent on OPEC oil and yet Great Britain suffers from the same economic problems that afflict France and West Germany.

The author's point is made primarily by

(A) offering Great Britain as a counterexample
(B) analyzing the economic difficulties of France and West Germany
(C) pointing out a misconception in reasoning
(D) proposing an alternative explanation
(E) drawing an analogy between France and West Germany

24. The once widely held perception of intellectuals as the clarifiers of fundamental moral issues is no longer valid today. Intellectuals no longer act as advocates for oppressed groups. Instead of applying their insights and analyses to the problems of these groups, they leave the debate to the politicians.

The logical structure of the passage above depends upon the author's closely linking the clarification of fundamental moral issues with

(A) intellectualism
(B) advocacy on behalf of oppressed groups
(C) insight and analysis
(D) debate on contemporary practical issues
(E) the role of politicians

25. The state with the greatest fraction of its population in urban areas, if the urban areas are considered to include the suburbs, is California. The West is highly urbanized, but California is exceptional even in that region: 91 percent of its population lives in urban areas. Geographically, however, California is rural: 96 percent of its land is outside urban areas.

If all of the statements above are true, which of the following must also be true?

(A) No state has a smaller fraction of its population in rural areas than California has.
(B) The current rate of population growth in California's urban areas exceeds the current rate of population growth in California's rural areas.
(C) In California 96 percent of the population lives on 9 percent of the land.
(D) No state has a smaller area devoted to urban settlement than California has.
(E) California's population density is among the highest of all states in the United States.

FOR GENERAL TEST 7 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 1			Section 2		
Number	Answer	P+	Number	Answer	P+
1	E	63	1	A	87
2	A	68	2	D	75
3	B	67	3	E	70
4	C	62	4	D	59
5	A	58	5	E	60
6	D	57	6	B	40
7	B	51	7	C	21
8	D	90	8	B	94
9	C	91	9	C	86
10	C	80	10	C	51
11	C	45	11	B	48
12	B	32	12	D	50
13	B	46	13	A	45
14	D	36	14	C	30
15	B	40	15	C	32
16	A	21	16	A	15
17	E	54	17	A	83
18	D	52	18	E	48
19	C	62	19	C	51
20	E	74	20	C	63
21	E	66	21	D	66
22	B	72	22	D	23
23	D	49	23	D	52
24	A	30	24	A	53
25	E	39	25	E	58
26	A	44	26	E	52
27	A	35	27	B	59
28	B	84	28	E	90
29	D	77	29	D	81
30	C	82	30	E	79
31	B	82	31	D	78
32	E	74	32	A	53
33	D	52	33	C	47
34	E	45	34	B	33
35	B	36	35	E	41
36	E	27	36	D	32
37	A	21	37	B	31
38	C	33	38	E	26

QUANTITATIVE ABILITY					
Section 3			Section 4		
Number	Answer	P+	Number	Answer	P+
1	C	90	1	D	93
2	B	85	2	A	90
3	A	86	3	C	88
4	B	81	4	C	89
5	C	72	5	A	84
6	A	75	6	B	84
7	D	68	7	C	71
8	A	56	8	A	73
9	D	64	9	B	59
10	C	53	10	D	59
11	B	46	11	B	57
12	A	36	12	A	44
13	C	42	13	B	33
14	D	28	14	C	40
15	C	27	15	D	25
16	B	92	16	E	86
17	B	84	17	D	79
18	C	87	18	C	76
19	E	96	19	D	64
20	D	60	20	B	73
21	A	87	21	C	80
22	D	62	22	A	68
23	B	89	23	C	30
24	C	66	24	B	71
25	A	48	25	A	17
26	D	55	26	E	57
27	E	50	27	D	32
28	A	48	28	B	34
29	E	47	29	B	41
30	B	27	30	E	33

ANALYTICAL ABILITY					
Section 5			Section 6		
Number	Answer	P+	Number	Answer	P+
1	A	86	1	C	65
2	C	72	2	D	52
3	E	41	3	C	87
4	B	89	4	B	58
5	D	73	5	D	86
6	C	54	6	E	91
7	B	84	7	A	81
8	C	57	8	D	75
9	B	59	9	D	54
10	E	51	10	E	77
11	A	42	11	E	62
12	D	42	12	B	80
13	E	67	13	A	57
14	A	57	14	C	67
15	B	44	15	E	24
16	D	42	16	D	51
17	A	36	17	E	39
18	D	32	18	A	44
19	E	16	19	D	52
20	A	16	20	A	18
21	C	35	21	C	32
22	D	17	22	E	28
23	C	57	23	A	45
24	A	32	24	B	42
25	B	34	25	A	32

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 7 ONLY AND THE PERCENTS BELOW*

Raw Score	Scaled Scores and Percents Below						Raw Score	Scaled Scores and Percents Below					
	Verbal	%	Quantitative	%	Analytical	%		Verbal	%	Quantitative	%	Analytical	%
73-76	800	99					35	410	32	510	41	640	83
72	790	99					34	400	29	500	38	630	81
71	780	99					33	400	29	490	35	610	78
70	760	99					32	390	27	470	31	600	76
69	750	98					31	380	25	460	28	580	70
68	740	98					30	370	22	450	26	570	68
67	730	97					29	360	20	430	22	550	62
66	720	96					28	360	20	420	20	540	60
65	700	95					27	350	18	410	18	520	54
64	690	94					26	340	16	390	15	510	51
63	680	93					25	330	14	380	13	490	46
62	670	92					24	330	14	370	12	470	39
61	660	91					23	320	12	360	11	460	37
60	650	89	800	99			22	310	11	340	8	440	30
59	640	88	800	99			21	300	10	330	7	430	29
58	630	86	800	99			20	290	8	320	6	410	23
57	620	85	800	99			19	280	7	300	5	400	21
56	600	81	790	99			18	270	5	290	4	380	17
55	590	80	780	98			17	260	4	280	3	370	15
54	580	78	770	97			16	250	4	260	2	350	11
53	570	76	750	94			15	240	3	250	2	340	9
52	560	73	740	92			14	230	2	240	1	320	7
51	550	71	730	91			13	220	1	220	1	300	4
50	540	68	710	87	800	99	12	210	1	210	1	290	3
49	540	68	700	85	800	99	11	200	0	200	0	270	2
48	530	65	690	83	800	99	10	200	0	200	0	260	2
47	520	63	670	79	800	99	9	200	0	200	0	240	1
46	510	60	660	77	800	99	8	200	0	200	0	230	1
45	500	57	650	74	800	99	7	200	0	200	0	210	0
44	490	55	630	70	780	98	0-6	200	0	200	0	200	0
43	480	52	620	67	770	98							
42	470	49	610	65	750	97							
41	460	46	590	61	740	96							
40	450	43	580	58	720	94							
39	440	40	570	55	710	93							
38	440	40	550	51	690	91							
37	430	37	540	48	670	88							
36	420	35	530	45	660	86							

*Percent scoring below the given scaled score, based on the performance of the 785,276 examinees who took the General Test between October 1, 1981, and September 30, 1984.

TEST 8

SECTION 1

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Even though formidable winters are the norm in the Dakotas, many people were unprepared for the ------- of the blizzard of 1888.

   (A) inevitability (B) ferocity (C) importance (D) probability (E) mildness

2. As the first streamlined car, the Airflow represented a ------- in automotive development, and although its sales were -------, it had an immense influence on automobile design.

   (A) milestone. .disappointing
   (B) breakthrough. .significant
   (C) regression. .unimportant
   (D) misjudgment. .calculable
   (E) revolution. .tolerable

3. While nurturing parents can compensate for adversity, cold or inconsistent parents may ------- it.

   (A) exacerbate (B) neutralize (C) eradicate (D) ameliorate (E) relieve

4. The architects of New York's early skyscrapers, hinting here at a twelfth-century cathedral, there at a fifteenth-century palace, sought to legitimize the city's social strivings by ------- a history the city did not truly -------.

   (A) revealing. .deserve
   (B) displaying. .desire
   (C) evoking. .possess
   (D) preserving. .experience
   (E) flouting. .believe

5. Actual events in the history of life on Earth are accidental in that any outcome embodies just one ------- among millions; yet each outcome can be ------- interpreted.

   (A) coincidence. .randomly
   (B) relationship. .predictably
   (C) fact. .readily
   (D) happening. .uniquely
   (E) possibility. .rationally

6. Although some of her fellow scientists ------- the unorthodox laboratory methodology that others found innovative, unanimous praise greeted her experimental results: at once pioneering and -------.

   (A) ignored. .untrustworthy
   (B) complimented. .foreseeable
   (C) welcomed. .mundane
   (D) decried. .unexceptionable
   (E) attacked. .inconclusive

7. Early critics of Emily Dickinson's poetry mistook for simplemindedness the surface of artlessness that in fact she constructed with such -------.

   (A) astonishment (B) vexation (C) allusion (D) innocence (E) cunning

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. MICROSCOPE : SMALL ::
   (A) telescope : distant
   (B) monocle : single
   (C) lens : refracted
   (D) camera : photographic
   (E) periscope : military

9. EXHIBITION : PAINTING ::
   (A) concert : symphony
   (B) accompaniment : melody
   (C) audition : chorus
   (D) improvisation : solo
   (E) rehearsal : orchestra

10. STERILIZATION : MICROORGANISMS ::
   (A) amnesty : deserters
   (B) defamation : enemies
   (C) inoculation : vaccine
   (D) deforestation : trees
   (E) assassination : murderers

11. RUFFLE : SHIRT ::
   (A) rafter : roof
   (B) molding : cabinet
   (C) gate : path
   (D) curb : sidewalk
   (E) shade : window

12. EMIGRATE : EXILE ::
   (A) select : organize
   (B) appoint : nominate
   (C) capture : imprison
   (D) enlist : conscript
   (E) contribute : deduct

13. BARRAGE : EXPLOSIVES ::
   (A) cacophony : sounds
   (B) deluge : rain
   (C) vista : sights
   (D) grenade : bombs
   (E) volcano : lava

14. WARY : GULLED ::
   (A) passionate : moved
   (B) taciturn : goaded
   (C) loquacious : befriended
   (D) vigilant : ambushed
   (E) shrill : satisfied

15. WILLFULNESS : HEADSTRONG ::
   (A) glibness : astute
   (B) determination : attentive
   (C) elegance : grandiose
   (D) subservience : fawning
   (E) anxiety : pessimistic

16. UNTENABLE : DEFENDED ::
   (A) valuable : insured
   (B) fordable : crossed
   (C) unjustifiable : forgiven
   (D) unpretentious : admired
   (E) invulnerable : injured

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Because of its accuracy in outlining the Earth's subsurface, the seismic-reflection method remains the most important tool in the search for petroleum reserves. In field practice, a subsurface is mapped by arranging a series of wave-train sources, such as small dynamite explosions, in a grid pattern. As each source is activated, it generates a wave train that moves downward at a speed determined uniquely by the rock's elastic characteristics. As rock interfaces are crossed, the elastic characteristics encountered generally change abruptly, which causes part of the energy to be reflected back to the surface, where it is recorded by seismic instruments. The seismic records must be processed to correct for positional differences between the source and the receiver, for unrelated wave trains, and for multiple reflections from the rock interfaces. Then the data acquired at each of the specific source locations are combined to generate a physical profile of the subsurface, which can eventually be used to select targets for drilling.

17. The passage is primarily concerned with

(A) describing an important technique
(B) discussing a new method
(C) investigating a controversial procedure
(D) announcing a significant discovery
(E) promoting a novel application

18. According to the passage, in the seismic-reflection method all of the following have a significant effect on the signal detected by the seismic instruments EXCEPT the

(A) presence of unrelated wave trains
(B) placement of the seismic instruments
(C) number of sources in the grid pattern
(D) nature of the reflectivity of the rock interfaces
(E) properties of rocks through which the wave train has traveled

19. It can be inferred from the passage that the seismic-reflection method would be likely to yield an inaccurate physical profile of the subsurface in which of the following circumstances?

(A) If the speed at which the wave train moved downward changed
(B) If the receiver were not positioned directly at the wave-train source
(C) If the rock on one side of a rock interface had similar elastic characteristics to those of the rock on the other side
(D) If the seismic records obtained for the different sources in a grid were highly similar to each other
(E) If there were no petroleum deposits beneath the area defined by the grid of wave-train sources

20. Which of the following best describes the organization of the passage?

(A) A method is criticized, and an alternative is suggested.
(B) An illustration is examined, and some errors are exposed.
(C) An assertion is made, and a procedure is outlined.
(D) A series of examples is presented, and a conclusion is drawn.
(E) A hypothesis is advanced, and supporting evidence is supplied.

GO ON TO THE NEXT PAGE.

Modern archaeological finds can still contribute much to the study of ancient literature. For example, forty years ago a survey of the early Greek dramatist Aeschylus' plays would have started with *The Suppliant Women*. Many factors internal to the play, but perhaps most especially the prominence of the chorus (which in this play has the main role), led scholars to consider it one of Aeschylus' earlier works. The consensus was that here was a drama truly reflecting an early stage in the evolution of tragedy out of choral lyric. The play was dated as early as the 490's B.C., in any event, well before Aeschylus' play *The Persians* of 472 B.C. Then, in 1952, a fragment of papyrus found at Oxyrhynchus was published stating the official circumstances and results of a dramatic contest. The fragment announced that Aeschylus won first prize with his Danaid tetralogy, of which *The Suppliant Women* is the opening play, and defeated Sophocles in the process. Sophocles did not compete in any dramatic contest before 468 B.C., when he won his first victory. Hence, except by special pleading (e.g., that the tetralogy was composed early in Aeschylus' career but not produced until the 460's B.C.), the Danaid tetralogy must be put after 468 B.C. In addition, a few letters in the fragment suggest the name Archedemides, archon in 463 B.C., thus perhaps tying the plays to that precise date, almost exactly halfway between Aeschylus' *Seven Against Thebes* of 467 B.C. and his *Oresteia*.

The implication of the papyrus administered a severe shock to the vast majority of classical scholars, who had confidently asserted that not only the role of the chorus but also language, metrics, and characterization all pointed to an early date. The discovery has resulted in no less than a total reevaluation of every chronological criterion that has been applied to or derived from Aeschylus' plays. The activity has been brisk, and a new creed has now spread. The prominence of the chorus in *The Suppliant Women* now is seen not as a sign of primitivism but as analogous to the massive choral songs of the *Oresteia*. Statistics have been formulated, or reformulated, to show that stylistically *The Suppliant Women* does actually occupy a position after *The Persians* and *Seven Against Thebes*, which now become the "primitive" plays, and before the *Oresteia*. While the new doctrine seems almost certainly correct, the one papyrus fragment raises the specter that another may be unearthed, showing, for instance, that it was a posthumous production of the Danaid tetralogy which bested Sophocles, and throwing the date once more into utter confusion. This is unlikely to happen, but it warns us that perhaps the most salutary feature of the papyrus scrap is its message of the extreme difficulty of classifying and categorizing rigidly the development of a creative artist.

21. The author of the passage focuses primarily on

(A) discussing a series of modern archaeological finds and their impact on the study of Greek literature

(B) recounting the effect of one archaeological find on modern ideas concerning a particular author's work

(C) giving a definitive and coherent account of the chronology of a particular author's work

(D) illustrating the many varieties of difficulties involved in establishing facts concerning ancient literature

(E) determining the exact value of archaeological finds in relation to the history of ancient literature

22. With respect to the study of ancient literature, which of the following statements best expresses the author's main point concerning modern archaeological finds?

(A) They can profoundly alter accepted views of ancient literary works, and can encourage flexibility in the way scholars look at the creative development of any artist.

(B) They can be severely shocking and can have a revivifying effect on the study of ancient literature, which has recently suffered from a lack of interest on the part of scholars.

(C) They can raise more questions than they answer and can be unreliable sources of information.

(D) They generally confirm scholars' ideas about ancient literary works and allow them to dispense with inferences drawn from the works' internal structure.

(E) They often undermine scholarly consensus in certain areas and create utter confusion concerning an author's work.

GO ON TO THE NEXT PAGE.

23. According to the passage, in the absence of definite knowledge concerning the dates of composition of ancient literary works, literary historians do which of the following when trying to establish the chronology of an author's work?

(A) Make assumptions about a single work's date of composition if such assumptions would not seriously affect interpretations of other works by the same author.
(B) Draw inferences concerning the date of a work's composition based on evidence internal to that work and on the author's other works.
(C) Ignore the date of a work's composition which is supplied by archaeological research when literary factors internal to the work contradict that date.
(D) Refrain from speculation concerning a work's date of composition unless archaeological finds produce information concerning it.
(E) Estimate the date of a work's composition without attempting to relate it to the author's development as an artist.

24. It can be inferred from the passage that which of the following plays or groups of plays is considered the latest in the date of its composition?

(A) *The Persians* (B) The Danaid tetralogy
(C) The *Oresteia* (D) *Seven Against Thebes*
(E) *The Suppliant Women*

25. With which of the following statements regarding the chronological criteria mentioned in lines 33-34 would the author be most likely to agree?

(A) Such criteria, whether applied to or derived from the plays, should only be used to confirm already existing knowledge.
(B) Such criteria, although derived from reliable external and internal evidence, should be changed continually to avoid rigidity in thinking.
(C) Such criteria, based on statistical analysis, are inherently more reliable than those of forty years ago.
(D) Such criteria, even when unsupported by external evidence, can resolve most questions.
(E) Such criteria, based on often ambiguous internal evidence, can lead to erroneous reconstructions of the chronology of an author's work.

26. The author's attitude toward the "activity" mentioned in line 35 and its consequences can best be described as one of

(A) amused tolerance (B) mocking envy
(C) grave doubt (D) angry disapproval
(E) unrestrained enthusiasm

27. The allusion to the hypothetical papyrus fragment in lines 45-49 does which of the following?

(A) Supports an argument concerning the date of *The Suppliant Women*.
(B) Refutes the views of the majority of scholars concerning the Oxyrhynchus papyrus find.
(C) Predicts the future results of archaeological research proposed in the passage.
(D) Undermines the validity of the currently accepted chronology of Aeschylus' works.
(E) Qualifies the author's agreement with the "new creed" developed since the Oxyrhynchus papyrus find.

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. SHALLOW: (A) arbitrary (B) painstaking (C) profound (D) restive (E) contrite

29. IMMUNE: (A) toxic (B) virulent (C) convalescent (D) having little energy (E) having no resistance

30. PROPAGATE:
(A) hesitate to join
(B) hope to prosper
(C) decide to accept
(D) begin to falter
(E) fail to multiply

31. LULL:
(A) pronounced interest
(B) intense discussion
(C) speedy resolution
(D) increased activity
(E) enhanced performance

32. PERPETUAL: (A) antecedent (B) coincident (C) intermittent (D) precipitous (E) languorous

33. ACCOLADE: (A) guarded emotion (B) scarce resource (C) temporization (D) repercussion (E) criticism

34. GAMBOL: (A) admit (B) plod (C) ruin (D) follow (E) fret

35. REFUTATION: (A) approval (B) verification (C) amplification (D) concurrence (E) computation

36. REQUITE: (A) incite (B) applaud (C) consume quickly (D) make inhospitable (E) leave unrepaid

37. REVERE: (A) imitate (B) dismiss (C) confuse (D) profane (E) disgrace

38. MOLLIFY: (A) ire (B) commence (C) abate (D) oppose (E) infuse

SECTION 2

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

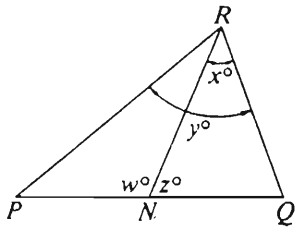
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



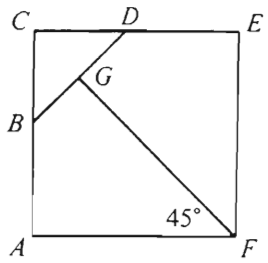
Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	A team won 75 percent of the 24 games it played.	
1.	The number of games the team won	20
2.	$(4)(10^5)$	400,000
	$rt = 0$ $t \neq 0$	
3.	r	0
4.	$8 - (-12) - 5$	$5 + (-8) + 12$
	Seven cars were used to transport the members of a chess team to their match, and each car contained either 4 team members or 3 team members.	
5.	The total number of members on the chess team	25

	Column A	Column B
6.	$\sqrt{41} + \sqrt{59}$	10
	$2x + 5y = 24$ $1 \leqq x \leqq 3$	
7.	x	y
	$x > 0$	
8.	$x + 1$	x^2



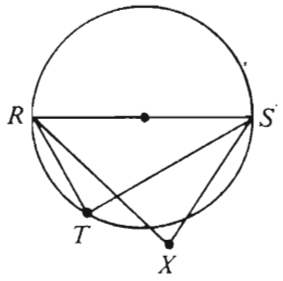
$ACEF$ is a square.
The area of triangular region BCD is 1.

9.	The area of region $ABGF$	3.5

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
10.	The area of a rectangular region with sides of lengths 25 and 3.1	The area of a circular region with radius 5
11.	The ratio of the lesser of two consecutive positive integers to the greater	$\frac{2}{3}$



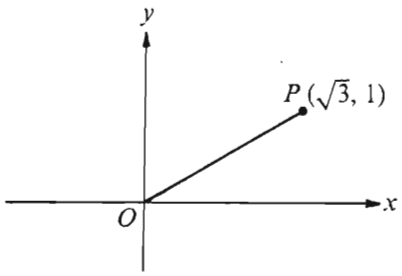
RS is a diameter of the circle.

12.	The measure of $\angle RTS$	The measure of $\angle RXS$

$$x + y = 2$$
$$xy = -3$$

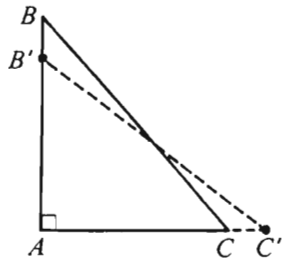
13.	$(x - y)^2$	16

	Column A	Column B



In the rectangular coordinate system, segment OP is rotated counterclockwise through an angle of 90° to position OQ (not shown).

14.	The x-coordinate of point Q	-1



Triangular garden ABC is redesigned by increasing the length of AC by 20 percent to point C' and decreasing the length of AB by 20 percent to point B'.

15.	The area of the original garden ABC	The area of the redesigned garden $AB'C'$

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Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. $\dfrac{\frac{1}{3}+\frac{1}{4}}{\frac{1}{3}-\frac{1}{4}} =$

(A) 0

(B) $\frac{1}{7}$

(C) $\frac{1}{2}$

(D) 1

(E) 7

17. A train travels 60 miles per hour for 3 hours and then 45 miles per hour for 2 hours. What is the train's average speed in miles per hour during the 5-hour period?

(A) 55

(B) 54

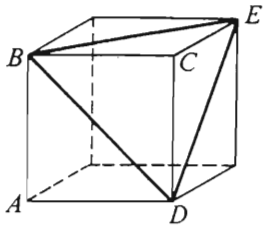
(C) $52\frac{1}{2}$

(D) 51

(E) 50

18. If $4x$ is 9 greater than the sum of x and $3y$, then x is how much greater than y?

(A) 3
(B) 6
(C) 9
(D) 12
(E) 15



19. Each edge of the cube shown above has length s. What is the perimeter of $\triangle BDE$?

(A) $3s$

(B) $6s$

(C) $\dfrac{s\sqrt{3}}{2}$

(D) $3s\sqrt{2}$

(E) $2s + s\sqrt{2}$

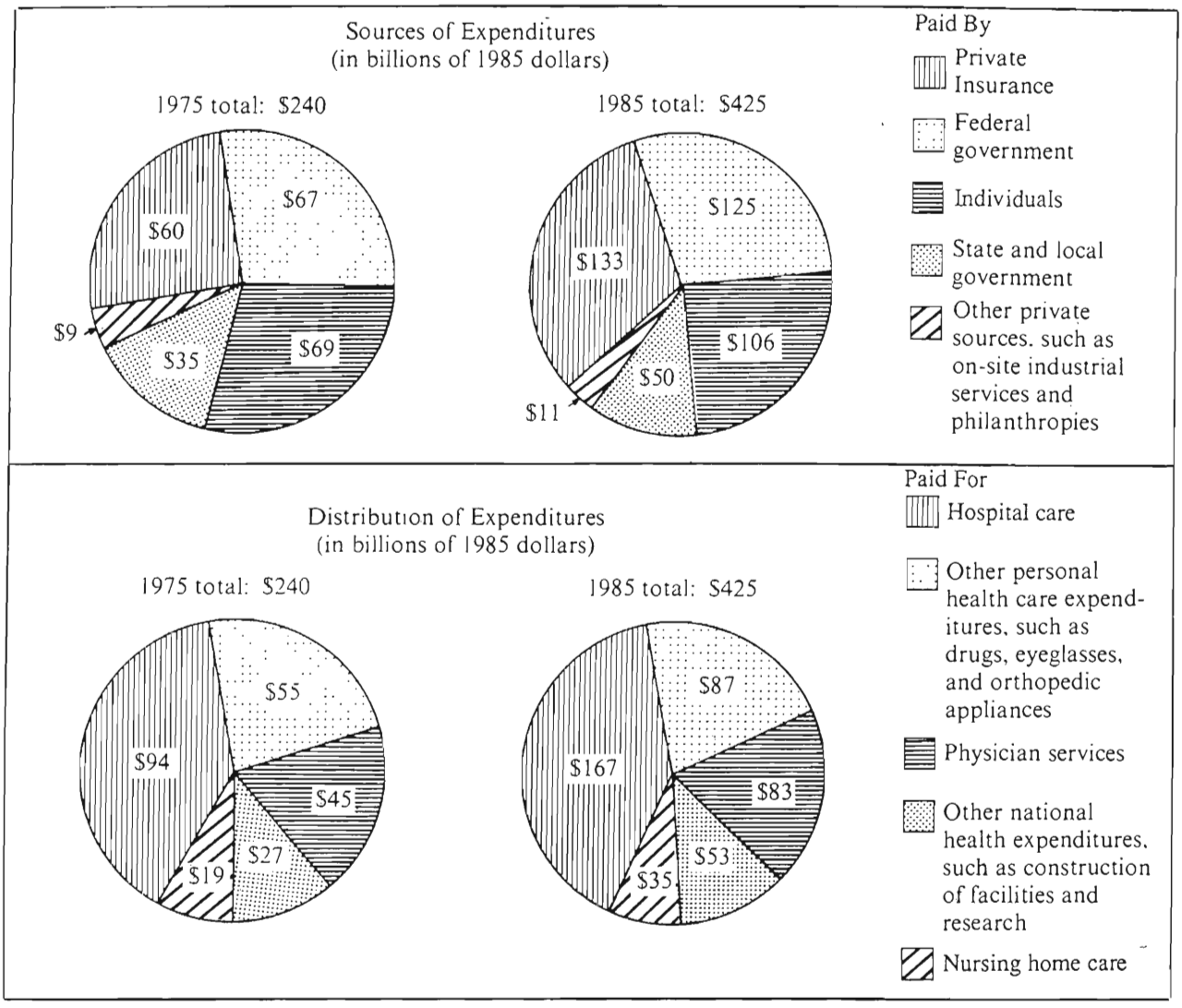
20. If the perimeter of a triangle is 18, then the length of one of the sides CANNOT be

(A) 1 (B) 3 (C) 6 (D) 8 (E) 9

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graphs. All references to "dollars" in these questions are the 1985 dollars referred to in the graphs.

TOTAL EXPENDITURES FOR MEDICAL CARE IN THE UNITED STATES
1975 AND 1985



Note: Drawn to scale.

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21. The category that accounted for $27 billion of the distribution of medical expenditures in 1975 accounted for how many billion dollars of the distribution of medical expenditures in 1985 ?

(A) 19
(B) 22
(C) 30
(D) 35
(E) 53

22. In 1985 the amount of medical expenditures paid by the federal government was how many times the amount paid by state and local government?

(A) $1\frac{1}{4}$

(B) $1\frac{3}{4}$

(C) $2\frac{1}{4}$

(D) $2\frac{1}{2}$

(E) $2\frac{3}{4}$

23. In 1985 approximately what percent of all medical expenditures was paid for physician services?

(A) 20%
(B) 25%
(C) 30%
(D) 35%
(E) 40%

24. The percent of total medical expenditures paid by private insurance in 1975 was most nearly equal to the percent of total medical expenditures paid by which of the following in 1985 ?

(A) Private insurance
(B) Federal government
(C) Individuals
(D) State and local government
(E) Other private sources

25. What was the approximate percent increase in total medical expenditures from 1975 to 1985 ?

(A) 44%
(B) 77%
(C) 85%
(D) 88%
(E) 135%

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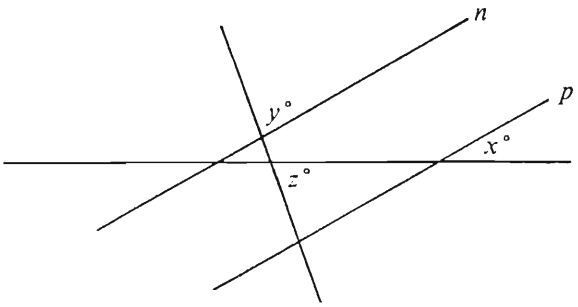
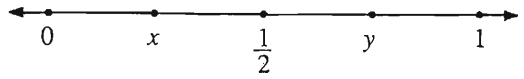


26. In the figure above, $n \parallel p$. If $x = 30$ and $y = 80$, what is the value of z?

(A) 70 (B) 65 (C) 60 (D) 55 (E) 50

27. Of the following, which is the closest approximation to $\sqrt{\frac{(97.942)(0.261)}{(0.51)^2}}$?

(A) 1
(B) 5
(C) 10
(D) 20
(E) 100



28. If x and y lie on the number line shown above, which of the following statements must be true?

(A) $\frac{1}{y} > 2$

(B) $\frac{1}{x} < 2$

(C) $\frac{1}{x} < \frac{1}{y}$

(D) $x + y < 1$

(E) $xy < \frac{1}{2}$

29. If the product of five integers is an odd integer, exactly how many of the five must be odd?

(A) One (B) Two (C) Three
(D) Four (E) Five

30. One-kth of a circular pie has been served. If the rest of the pie is divided into n equal servings, then each of these servings is what fraction of the whole pie?

(A) $\frac{1}{nk}$

(B) $\frac{k-n}{nk}$

(C) $\frac{1}{n-k}$

(D) $\frac{k-1}{nk}$

(E) $\frac{k-1}{n}$

SECTION 3

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage, graph, table, or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-6

A group of eight people is going camping in tents—tent 1, tent 2, and tent 3. The group consists of two women—V and X—and six girls—K, L, M, O, P, and T. Tent assignments will be made as follows:

There will be no more than three persons in a tent.
V will be in tent 1.
V will not be in a tent with her daughter O, and X will not be in a tent with her daughter P.
K, L, and M, who are close friends, will be in a tent together.

1. Which of the following can be in tent 1 ?

(A) K
(B) L
(C) M
(D) O
(E) X

2. If K is in tent 2, which of the following must be true?

(A) M is in tent 3.
(B) O is in tent 3.
(C) P is in tent 2.
(D) T is in tent 1.
(E) X is in tent 3.

3. If the two women are together in a tent, which of the following is a pair of girls who must be together in a tent?

(A) K and P
(B) L and T
(C) M and O
(D) O and P
(E) P and T

4. If X is in tent 2, which of the following must be in the same tent as V ?

(A) K
(B) L
(C) O
(D) P
(E) T

5. If L is in tent 3 and the two women are not in the same tent as each other, the people in tent 2 can be

(A) M and T only
(B) X and T only
(C) K, M, and O
(D) O, P, and X
(E) O, T, and X

6. If V and T are together in a tent, it is possible that

(A) K and P are together in a tent
(B) O and T are together in a tent
(C) O and X are the only people in tent 2
(D) P and X are the only people in tent 3
(E) T and V are the only people in tent 1

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7. Grammarians have for years condemned as ungrammatical the English phrase "between you and I," insisting that the correct phrasing is "between you and me," with the objective case after a preposition. Such condemnations, however, are obviously unfounded, because Shakespeare himself, in *The Merchant of Venice*, wrote, "All debts are cleared between you and I."

Which of the following, if true, most seriously weakens the argument above?

(A) In his plays, Shakespeare intentionally had some of his characters use phrases he considered ungrammatical.
(B) The phrase "between you and I" appears infrequently in Shakespeare's writings.
(C) The more modern an English word or phrase, the less likely that modern grammarians will consider it acceptable for formal usage.
(D) Many modern speakers of English sometimes say "between you and I" and sometimes say "between you and me."
(E) Most native speakers of English who choose to say "between you and I" do so because they know that Shakespeare used that phrase.

8. Around 1850 there were about 800 farms in Otsego County. By the 1950's the number of farms had dropped to around 400. By 1988 there were only 81 farms in operation. Therefore, the amount of land in the county that is devoted to farming has dropped by about 90 percent in the past 140 years.

A major flaw in the argument above is that it

(A) counts the number of farms only approximately
(B) fails to say whether the use now being made of the land previously devoted to farming is income-producing
(C) ignores the possibility that the average size of farms has changed
(D) gives data for only 3 of the past 140 years
(E) does not take into account the type of product or crop each farm yields

9. Senator: Jones is highly qualified for appointment as a judge, as evidenced by Jones's receiving a unanimous vote of "qualified" on the formal rating scale used by the Lawyers' Committee. That committee advises the Senate on judicial appointments.

Which of the following, if true, is the best reason for dismissing the senator's claim that Jones is highly qualified?

(A) Several members of the Lawyers' Committee are not themselves qualified for judicial appointments.
(B) The Lawyers' Committee does not advise the Senate on all judicial appointments.
(C) The Lawyers' Committee gives a unanimous vote of "qualified" only to those candidates for judicial appointments who meet the committee's stringent standards for appropriate prior experience and ethical conduct.
(D) The Lawyers' Committee gives a unanimous vote of either "highly qualified" or "very highly qualified" to 95 percent of all candidates for judicial appointments.
(E) Jones, like most lawyers, is a member of the professional organization that originally suggested the establishment of the Lawyers' Committee.

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Questions 10-13

On a tax form, a taxpayer is filling in numbers on eleven lines—F, G, H, I, K, L, M, Q, R, V, and Z—according to the following instructions and no others:

Line F must be derived from lines G, H, and V as G plus H minus V.
Line L must be derived from lines I and K as I plus K.
Line Q must be derived from lines L and M as L minus M.
Line R must be derived from lines Q and F as Q minus F.
Line V must be derived from line L as five percent of L.
Line Z must be derived from line R as half of R.

10. V cannot be derived unless which of the following is known?

(A) F
(B) G
(C) H
(D) I
(E) M

11. F cannot be derived unless which of the following is known?

(A) K
(B) M
(C) Q
(D) R
(E) Z

12. It is necessary for the taxpayer to know H before the taxpayer can derive

(A) L
(B) M
(C) Q
(D) R
(E) V

13. If the taxpayer knows I, H, K, and M but not G, which of the following is a pair of lines that the taxpayer can derive?

(A) F and V
(B) L and Q
(C) L and R
(D) R and V
(E) R and Z

GO ON TO THE NEXT PAGE.

Questions 14-19

At a conference, exactly seven speakers—Qualls, Ramírez, Smith, Titus, Umana, Vines, and Wertz—are to speak. In the schedule for the conference, there are seven time slots available for speakers, and the time slots are numbered consecutively 1 through 7. Exactly one speaker must be assigned to each time slot according to the following conditions:

Qualls must speak immediately before or immediately after Titus speaks.
Titus must speak sometime before Ramírez speaks.
Smith must speak in either time slot 1 or time slot 7.
Vines must speak in time slot 4.

14. Which of the following must be true?

(A) Qualls speaks sometime before Ramírez speaks.
(B) Qualls speaks sometime before Vines speaks.
(C) Smith speaks sometime before Titus speaks.
(D) Vines speaks sometime before Ramírez speaks.
(E) Wertz speaks sometime before Vines speaks.

15. If Ramírez speaks immediately before Vines speaks, which of the following could be true?

(A) Qualls speaks in time slot 5.
(B) Smith speaks in time slot 1.
(C) Titus speaks in time slot 3.
(D) Umana speaks in time slot 2.
(E) Wertz speaks in time slot 6.

16. If Ramírez speaks sometime before Smith speaks, which of the following must be true?

(A) Qualls speaks sometime before Umana speaks.
(B) Ramírez speaks sometime before Vines speaks.
(C) Titus speaks sometime before Vines speaks.
(D) Umana speaks sometime before Ramírez speaks.
(E) Wertz speaks sometime before Qualls speaks.

17. If Umana is to speak in time slot 2, there will be a total of how many scheduling possibilities from which to select the schedule of speakers?

(A) One
(B) Two
(C) Three
(D) Four
(E) Six

18. If Wertz speaks in time slot 7, any of the following pairs of speakers could speak in time slots immediately adjacent to each other EXCEPT

(A) Qualls and Ramírez
(B) Ramírez and Umana
(C) Smith and Qualls
(D) Smith and Titus
(E) Vines and Umana

19. If Umana speaks sometime before Qualls speaks, which of the following must be true?

(A) Smith speaks sometime before Umana speaks.
(B) Titus speaks sometime before Vines speaks.
(C) Umana speaks sometime before Wertz speaks.
(D) Vines speaks sometime before Ramírez speaks.
(E) Wertz speaks sometime before Smith speaks.

GO ON TO THE NEXT PAGE.

Questions 20-22

The relative hardness of five minerals—N, O, R, S, and T—is to be determined. One mineral is harder than another if drawing an edge of the first mineral across a surface of the second mineral produces a scratch; otherwise, the first mineral is either equally hard or not as hard as the second. The following results have so far been obtained:

N scratches O.
R scratches S.
O does not scratch T.

20. Which of the following could be the five minerals in order from the hardest to the softest if no two of them are equally hard?

(A) N, R, T, S, O
(B) N, T, S, O, R
(C) R, N, O, S, T
(D) R, O, S, T, N
(E) T, N, S, R, O

21. If O scratches S, which of the following must be true?

(A) N is harder than R.
(B) N is harder than T.
(C) R is harder than N.
(D) R is harder than T.
(E) T is harder than S.

22. If S scratches T, any of the following pairs of minerals could be the same hardness as each other EXCEPT

(A) N and R
(B) N and S
(C) N and T
(D) O and T
(E) R and T

23. The average life expectancy of the population of Japan has risen steadily since 1960 and is now the highest national average in the world, even though heart disease among the Japanese has increased since they began to eat more of the fatty foods typical of the diets of people in Western countries.

Which of the following, if true, best helps to explain the steady rise in life expectancy that is cited above?

(A) The average Westerner is still five times more likely to develop heart disease than is the average Japanese person.
(B) Since 1960 the decline in illnesses that kill more Japanese people than does heart disease has been greater than the increase in heart disease.
(C) The life expectancy of the average Westerner has risen at a slower rate since 1960 than it did before 1960.
(D) The Japanese diet has traditionally included many nonfatty foods that are thought to reduce the risk of developing heart disease.
(E) The life-style of some Japanese people includes regular exercise, which is thought to help the heart resist the loss of strength that accompanies aging.

GO ON TO THE NEXT PAGE.

24. For some women the cost of giving birth can be an unexpectedly large burden. The average normal birth now costs $3,200, and a birth with complications can cost thousands of dollars more. Of women in the primary childbearing age range of eighteen to twenty-four, who account for about 40 percent of all births in this country annually, more than 25 percent have no health-care insurance to pay maternity costs.

    If the statements above are true, which of the following must also be true?

    (A) Each year, about 75 percent of all births in this country are to women who have health-care coverage of maternity costs.
    (B) Each year, about 60 percent of all births in this country are to women who are younger than eighteen or older than twenty-four.
    (C) For an average birth, health-care insurance pays about 75 percent of $3,200.
    (D) In this country, about 75 percent of the women who do not have health-care coverage of maternity costs are younger than eighteen or older than twenty-four.
    (E) In this country, nearly 75 percent of the women in the primary childbearing age range give birth with no complications.

25. One theory of the Moon's origin is that the Earth, early in its development, was a rapidly rotating body of molten rock in which most of the iron had settled to the core; some of this fluid was cast off from the surface of the spinning mass and later solidified to form the Moon.

    Which of the following conclusions can best be supported by the theory above of the Moon's origin, if that theory is correct?

    (A) The Moon is the only sizable heavenly body in orbit around the Earth.
    (B) The Moon has proportionally less iron at its core than the Earth does.
    (C) The surface of the Moon solidified after the surface of the Earth did.
    (D) Most of the fluid cast off from the Earth was dispersed into outer space.
    (E) The Moon, like the Earth, has a solid surface and a molten core.

SECTION 5

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. This project is the first step in a long-range plan of research whose ------- goal, still many years off, is the creation of a new prototype.

   (A) cooperative (B) reasoned (C) original
   (D) ultimate (E) intentional

2. Eric was frustrated because, although he was adept at making lies sound --------, when telling the truth, he ------- the power to make himself believed.

   (A) plausible. .lacked (B) convincing. .held
   (C) honest. .found (D) true. .acquired
   (E) logical. .claimed

3. In certain forms of discourse such as the parable, the central point of a message can be effectively communicated even though this point is not -------.

   (A) preferred (B) explicit (C) inferable
   (D) discerned (E) illustrated

4. Always circumspect, she was reluctant to make judgments, but once arriving at a conclusion, she was ------- in its defense.

   (A) nonplussed (B) obsequious
   (C) intransigent (D) deferential
   (E) negligent

5. The techniques now available to livestock breeders will continue to be -------, but will probably be ------- by new ones under development.

   (A) fruitful. .reversed
   (B) refined. .upgraded
   (C) inconvenient. .reassessed
   (D) used. .supplemented
   (E) harmless. .improved

6. Any population increase beyond a certain level necessitates greater ------- vegetable foods; thus, the ability of a society to choose meat over cereals always arises, in part, from ------- the number of people.

   (A) reliance on. .replenishing
   (B) production of. .estimating
   (C) spending on. .concealing
   (D) recourse to. .limiting
   (E) attention to. .varying

7. Ethologists are convinced that many animals survive through learning—but learning that is ------- their genetic programming, learning as thoroughly ------- as the most instinctive of behavioral responses.

   (A) superseded by. .primitive
   (B) compatible with. .transient
   (C) complementary to. .familiar
   (D) derived from. .inventive
   (E) dictated by. .stereotyped

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. OSTRICH : BIRD ::
   (A) caterpillar : moth
   (B) lizard : frog
   (C) bud : leaf
   (D) tiger : cat
   (E) gust : storm

9. WARDROBE : CLOTHES ::
   (A) stove : crockery
   (B) bookcase : books
   (C) drawer : shelves
   (D) pantry : medicine
   (E) necklace : earrings

10. PRACTICING : EXPERTISE ::
   (A) thinking : logic
   (B) writing : clarity
   (C) growing : health
   (D) exercising : strength
   (E) eating : nutrition

11. ARTERY : PLAQUE ::
   (A) river : levee
   (B) track : switch
   (C) channel : silt
   (D) information : flow
   (E) tunnel : wall

12. ANECDOTE : STORY ::
   (A) film : theater
   (B) chapter : novel
   (C) lyric : song
   (D) joke : parody
   (E) skit : play

13. SUPPLANT : REPLACE ::
   (A) snatch : take
   (B) beg : invite
   (C) convict : accuse
   (D) savor : gulp
   (E) miss : lose

14. ALLERGY : REACTION ::
   (A) rash : body
   (B) lancet : instrument
   (C) antihistamine : symptom
   (D) cocoon : skeleton
   (E) pollen : flower

15. APHORISTIC : TERSE ::
   (A) eloquent : ornate
   (B) esoteric : important
   (C) hyperbolic : exaggerated
   (D) metaphorical : fantastic
   (E) equivocal : straightforward

16. ZEALOUS : ENTHUSIASTIC ::
   (A) pedantic : educated
   (B) flamboyant : stylish
   (C) cautious : prudent
   (D) pious : virtuous
   (E) idolatrous : devoted

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Scholars often fail to see that music played an important role in the preservation of African culture in the United States. They correctly note that slavery stripped some cultural elements from Black people—their political and economic systems—but they underestimate the significance of music in sustaining other African cultural values. African music, unlike the music of some other cultures, was based on a total vision of life in which music was not an isolated social domain. In African culture music was pervasive, serving not only religion, but all phases of life, including birth, death, work, and play. The methods that a community devises to perpetuate itself come into being to preserve aspects of the cultural legacy that that community perceives as essential. Music, like art in general, was so inextricably a part of African culture that it became a crucial means of preserving the culture during and after the dislocations of slavery.

17. The primary purpose of the passage is to
    (A) analyze the impact that slavery had on African political and economic systems
    (B) review the attempt of recent scholarship to study the influence of African music on other music
    (C) correct the failure of some scholars to appreciate the significance of music in African culture
    (D) survey the ways by which people attempt to preserve their culture against the effects of oppression
    (E) compare the relative importance of music with that of other art forms in culture

18. In line 9, the phrase "isolated social domain" refers to
    (A) African music in relation to contemporary culture as a whole
    (B) music as it may be perceived in non-African cultures
    (C) a feature of African music that aided in transmitting African cultural values
    (D) an aspect of the African cultural legacy
    (E) the influence of music on contemporary culture

19. Which of the following statements concerning the function of African music can be inferred from the passage?
    (A) It preserved cultural values because it was thoroughly integrated into the lives of the people.
    (B) It was more important in the development of African religious life than in other areas of culture.
    (C) It was developed in response to the loss of political and economic systems.
    (D) Its pervasiveness in African culture hindered its effectiveness in minimizing the impact of slavery.
    (E) Its isolation from the economic domains of life enabled it to survive the destructive impact of slavery.

20. According to the author, scholars would err in drawing which of the following conclusions?
    I. Slavery stripped the slaves of their political and economic systems.
    II. African music was similar to all other traditions of music in that it originated in a total vision of life.
    III. Music was a crucial part of the African cultural legacy.
    (A) I only
    (B) II only
    (C) I and II only
    (D) II and III only
    (E) I, II, and III

GO ON TO THE NEXT PAGE.

Traditionally, pollination by wind has been viewed as a reproductive process marked by random events in which the vagaries of the wind are compensated for by the generation of vast quantities of pollen, so that the ultimate production of new seeds is assured at the expense of producing much more pollen than is actually used. Because the potential hazards pollen grains are subject to as they are transported over long distances are enormous, wind-pollinated plants have, in the view above, compensated for the ensuing loss of pollen through happenstance by virtue of producing an amount of pollen that is one to three orders of magnitude greater than the amount produced by species pollinated by insects.

However, a number of features that are characteristic of wind-pollinated plants reduce pollen waste. For example, many wind-pollinated species fail to release pollen when wind speeds are low or when humid conditions prevail. Recent studies suggest another way in which species compensate for the inefficiency of wind pollination. These studies suggest that species frequently take advantage of the physics of pollen motion by generating specific aerodynamic environments within the immediate vicinity of their female reproductive organs. It is the morphology of these organs that dictates the pattern of airflow disturbances through which pollen must travel. The speed and direction of the airflow disturbances can combine with the physical properties of a species' pollen to produce a species-specific pattern of pollen collision on the surfaces of female reproductive organs. Provided that these surfaces are strategically located, the consequences of this combination can significantly increase the pollen-capture efficiency of a female reproductive organ.

A critical question that remains to be answered is whether the morphological attributes of the female reproductive organs of wind-pollinated species are evolutionary adaptations to wind pollination or are merely fortuitous. A complete resolution of the question is as yet impossible since adaptation must be evaluated for each species within its own unique functional context. However, it must be said that, while evidence of such evolutionary adaptations does exist in some species, one must be careful about attributing morphology to adaptation. For example, the spiral arrangement of scale-bract complexes on ovule-bearing pine cones, where the female reproductive organs of conifers are located, is important to the production of airflow patterns that spiral over the cone's surfaces, thereby passing airborne pollen from one scale to the next. However, these patterns cannot be viewed as an adaptation to wind pollination because the spiral arrangement occurs in a number of non-wind-pollinated plant lineages and is regarded as a characteristic of vascular plants, of which conifers are only one kind, as a whole. Therefore, the spiral arrangement is not likely to be the result of a direct adaptation to wind pollination.

21. The author of the passage is primarily concerned with discussing

(A) the current debate on whether the morphological attributes of wind-pollinated plants are evolutionary adaptations
(B) the kinds of airflow patterns that permit wind-pollinated plants to capture pollen most efficiently
(C) the ways in which the reproductive processes of wind-pollinated plants are controlled by random events
(D) a recently proposed explanation of a way in which wind-pollinated plants reduce pollen waste
(E) a specific morphological attribute that permits one species of wind-pollinated plant to capture pollen

22. The author suggests that explanations of wind pollination that emphasize the production of vast quantities of pollen to compensate for the randomness of the pollination process are

(A) debatable and misleading
(B) ingenious and convincing
(C) accurate but incomplete
(D) intriguing but controversial
(E) plausible but unverifiable

23. According to the passage, the "aerodynamic environments" mentioned in line 23, when they are produced, are primarily determined by the

(A) presence of insects near the plant
(B) physical properties of the plant's pollen
(C) shape of the plant's female reproductive organs
(D) amount of pollen generated by the plant
(E) number of seeds produced by the plant

24. According to the passage, true statements about the release of pollen by wind-pollinated plants include which of the following?

I. The release can be affected by certain environmental factors.
II. The amount of pollen released increases on a rainy day.
III. Pollen is sometimes not released by plants when there is little wind.

(A) II only
(B) III only
(C) I and II only
(D) I and III only
(E) I, II, and III

GO ON TO THE NEXT PAGE.

25. The passage suggests that the recent studies cited in lines 19-21 have not done which of the following?

(A) Made any distinctions between different species of wind-pollinated plants.
(B) Considered the physical properties of the pollen that is produced by wind-pollinated plants.
(C) Indicated the general range within which plant-generated airflow disturbances are apt to occur.
(D) Included investigations of the physics of pollen motion and its relationship to the efficient capture of pollen by the female reproductive organs of wind-pollinated plants.
(E) Demonstrated that the morphological attributes of the female reproductive organs of wind-pollinated plants are usually evolutionary adaptations to wind pollination.

26. It can be inferred from the passage that the claim that the spiral arrangement of scale-bract complexes on an ovule-bearing pine cone is an adaptation to wind pollination would be more convincing if which of the following were true?

(A) Such an arrangement occurred only in wind-pollinated plants.
(B) Such an arrangement occurred in vascular plants as a whole.
(C) Such an arrangement could be shown to be beneficial to pollen release.
(D) The number of bracts could be shown to have increased over time.
(E) The airflow patterns over the cone's surfaces could be shown to be produced by such arrangements.

27. Which of the following, if known, is likely to have been the kind of evidence used to support the view described in the first paragraph?

(A) Wind speeds need not be very low for wind-pollinated plants to fail to release pollen.
(B) The female reproductive organs of plants often have a sticky surface that allows them to trap airborne pollen systematically.
(C) Grasses, as well as conifers, generate specific aerodynamic environments within the immediate vicinity of their reproductive organs.
(D) Rain showers often wash airborne pollen out of the air before it ever reaches an appropriate plant.
(E) The density and size of an airborne pollen grain are of equal importance in determining whether that grain will be captured by a plant.

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. IMPROMPTU: (A) carefully rehearsed (B) widely recognized (C) narrowly focused (D) purposely vague (E) unwittingly funny

29. BALLOON: (A) regain completely (B) decrease slowly (C) respond rapidly (D) survey thoroughly (E) request humbly

30. AVID: (A) independent (B) inquisitive (C) forgetful (D) swift (E) indifferent

31. MOROSE: (A) fast-talking (B) quick-witted (C) lighthearted (D) casual (E) charming

32. ANOMALY:
(A) predicted occurrence
(B) temporary solution
(C) easy problem
(D) continuous process
(E) constant interference

33. NEOLOGISM: (A) syllogism (B) idealism (C) archaism (D) paternalism (E) ostracism

34. RAREFY: (A) condense (B) conceive (C) consign (D) conduct (E) confound

35. CAUSTIC: (A) nonflammable (B) anesthetic (C) antiseptic (D) convoluted (E) innocuous

36. SOLVENT: (A) catalyst (B) detergent (C) reactant (D) lubricant (E) precipitant

37. ESTIMABLE: (A) recalcitrant (B) mendacious (C) infamous (D) obstinate (E) stingy

38. PRODIGALITY: (A) disinterest (B) guilt (C) passivity (D) penury (E) perfidy

SECTION 6

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

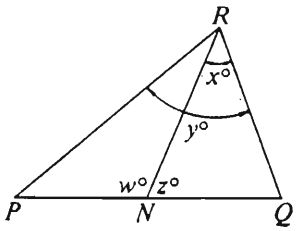
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

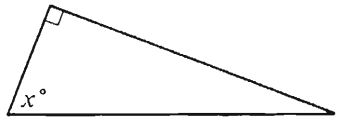


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

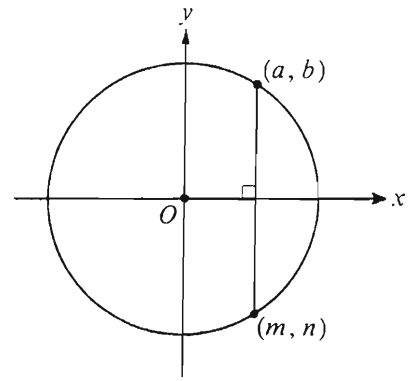
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	$(-1)^6$	$(-1)^7$
	$x > 2$ and $z > 2$	
2.	$\frac{2}{x}$	$\frac{z}{2}$
3.	$25(26) + 26(75)$	2,500
	$\sqrt{x^2 + 1} = 5$	
4.	x	5



5.	x	60

	Column A	Column B
6.	The average (arithmetic mean) of 5 numbers, each less than 7 and greater than 6	The average (arithmetic mean) of 7 numbers, each less than 6 and greater than 5
	s and t are positive numbers. $s > \frac{t}{3}$	
7.	s	t



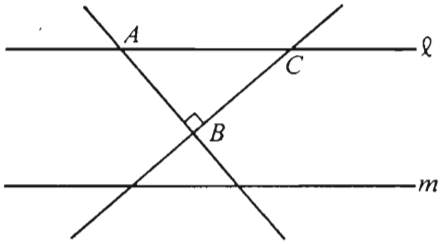
Point O is the center of the circle in the rectangular coordinate system.

8.	$a + b$	$m + n$

GO ON TO THE NEXT PAGE.

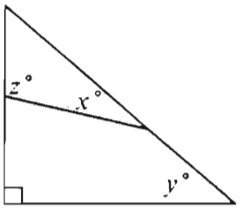
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	n and r are positive integers such that $4^n = 2^{r+1}$.	
9.	r	$2n - 1$



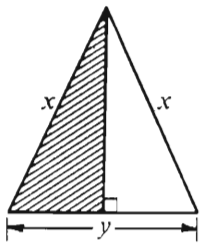
Lines ℓ and m are parallel.

10.	AB	BC



11.	$x + z$	$90 + y$

	Column A	Column B
	Last year retail sales in Country M totaled x dollars, and the retail sales of the 5 largest retailers in Country M accounted for 75 percent of this total.	
12.	The average (arithmetic mean) retail sales for the 5 largest retailers in Country M last year	$\frac{3x}{20}$ dollars



13.	The area of the shaded region	$\frac{xy}{4}$
	A K-number is a positive integer with the special property that 3 times its units' digit is equal to 2 times its tens' digit.	
14.	The number of K-numbers between 10 and 99	3
	In an election each voter voted for one of two candidates, X and Y. The number of votes that Candidate X received was $\frac{1}{3}$ more than the number of votes that Candidate Y received.	
15.	The fraction of the total vote that Candidate X received	$\frac{4}{7}$

GO ON TO THE NEXT PAGE.

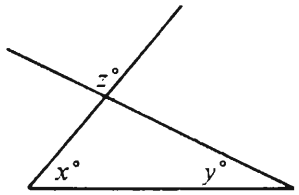
Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. If integer x were divided by 7, the quotient would be 12 with a remainder of 1. Therefore, x equals

(A) 91 (B) 90 (C) 88 (D) 85 (E) 83

17. If $y \neq 0$ and $2x + y = 12$, then which of the following is NOT a possible value of x?

(A) 12
(B) 10
(C) 8
(D) 6
(E) 4



18. In the figure above, what is $x + y$ in terms of z?

(A) $180 - z$
(B) $180 + z$
(C) $z - 180$
(D) $z + 180$
(E) z

19. If $4x + 3y = 8$ and $\frac{x}{2} = \frac{1}{4}$, what is the value of y?

(A) $\frac{4}{3}$
(B) 2
(C) $\frac{7}{3}$
(D) 3
(E) $\frac{10}{3}$

20. Two people were hired to mow a lawn for a total of \$45. They completed the job with one person working for 1 hour and 20 minutes and the other working 40 minutes. If they split the \$45 in proportion to the amount of time each spent working on the job, how much did the person who worked longer receive?

(A) \$33.75
(B) \$30.00
(C) \$27.50
(D) \$25.00
(E) \$22.50

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following table.

NUMBER OF MOTOR VEHICLES IN FIVE COUNTRIES
1983 AND 1985

	Number of Motor Vehicles			
	1983		1985	
Country	Per Square Mile	Per 1,000 Population	Per Square Kilometer*	Per 1,000 Population
A	109	182	49	206
B	60	243	23	252
C	54	123	29	167
D	109	190	49	220
E	23	447	9	453

*1 square mile = 2.6 square kilometers

21. If in 1983 the total area of Country *B* was 95,000 square miles, how many million motor vehicles did it have?

(A) 1.6
(B) 2.2
(C) 4.1
(D) 5.7
(E) 6.3

22. In 1985 Country *D* had approximately how many motor vehicles per square mile?

(A) 190
(B) 125
(C) 110
(D) 50
(E) 35

23. In 1983 the number of motor vehicles per square mile for Country *E* was approximately what percent of the number of motor vehicles per square mile for Country *A*?

(A) 18%
(B) 21%
(C) 27%
(D) 33%
(E) 47%

24. If the population of Country *D* in 1983 was 80 million, then the number of motor vehicles in that country was how many million?

(A) 15.2
(B) 16.5
(C) 17.0
(D) 17.6
(E) 18.1

25. In 1985 the number of square kilometers per 100 motor vehicles in Country *C* was approximately

(A) 0.29
(B) 0.34
(C) 1.34
(D) 2.90
(E) 3.45

GO ON TO THE NEXT PAGE.

26. If 5 percent of a rectangular lot is covered by a rectangular shed that is 25 feet long and 24 feet wide, what is the area of the lot in square feet?

(A) 3,000
(B) 5,700
(C) 12,000
(D) 22,500
(E) 30,000

27. For $x \neq 2$ and $x \neq 3$, $\frac{-2}{x-2} + \frac{x}{x-3} =$

(A) 1

(B) $\frac{1}{x-3}$

(C) $\frac{x-2}{2x-5}$

(D) $\frac{-2x}{(x-2)(x-3)}$

(E) $\frac{x^2-4x+6}{(x-2)(x-3)}$

28. A circular region has circumference c inches and area k square inches. If $c = 3k$, what is the radius of the circle in inches?

(A) $\frac{\sqrt{2}}{3}$

(B) $\sqrt{\frac{2}{3}}$

(C) $\frac{2}{3}$

(D) $\frac{4\pi}{9}$

(E) $\frac{2\pi}{3}$

29. In a certain country, a person is born every 3 seconds and a person dies every 10 seconds. Therefore, the birth and death rates account for a population growth rate of one person every

(A) $3\frac{1}{3}$ sec

(B) $4\frac{2}{7}$ sec

(C) 7 sec

(D) $11\frac{2}{3}$ sec

(E) 13 sec

30. If r and s are positive integers, each greater than 1, and if $11(s-1) = 13(r-1)$, what is the least possible value of $r+s$?

(A) 2
(B) 11
(C) 22
(D) 24
(E) 26

SECTION 7

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage, graph, table, or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-6

All electronic messages in a large corporation are transmitted by means of a message network that connects eight computers—Q, R, S, T, W, X, Y, and Z. All of the connections are two-way, so that messages can be sent back and forth between any two connected computers. Any given message enters and leaves a given computer at most once. The computers are connected only in the following way:

Q is connected to R and to T.
S is connected to R and to T.
W is connected to S and to Y.
X is connected to S, to Y, and to Z.

1. The path followed by messages sent from Y to Z must include which of the following computers?

(A) Q
(B) R
(C) S
(D) W
(E) X

2. Messages sent from Q to W can go along any of the following paths EXCEPT

(A) Q to R to S to W
(B) Q to T to S to W
(C) Q to R to S to T to W
(D) Q to R to S to X to Y to W
(E) Q to T to S to X to Y to W

3. Which of the following specifies in its entirety a sequence, from first to last, of computers through which a message from Z to T can pass?

(A) Z, Q, T
(B) Z, X, Q, T
(C) Z, X, Y, T
(D) Z, X, S, R, T
(E) Z, X, Y, W, S, T

4. What is the minimum number of computers, excluding the originating and destination computers, through which a message from T to X must pass?

(A) One
(B) Two
(C) Three
(D) Four
(E) Five

5. Disconnecting which of the following computers from every computer to which it is connected would leave exactly one of the other computers unconnected to the rest of the message network?

(A) Q
(B) R
(C) W
(D) X
(E) Z

6. A message from one of the computers to another is to be transmitted through all of the other computers, with each transmitting computer sending the message to only one other computer. Which of the following pairs could be the originating computer and the computer finally receiving the message?

(A) Q and W
(B) Q and Z
(C) R and Z
(D) W and T
(E) W and Z

GO ON TO THE NEXT PAGE.

7. Pauline and Lorraine are paid the same amount of wages per hour for working at the same company, but Pauline has a more difficult job than Lorraine. Pauline argues that because her job is more difficult, the company should pay her more than it pays Lorraine.

   Which of the following statements best supports Pauline's argument?

   (A) Lorraine is not opposed to being paid less than Pauline.
   (B) The company's pay scale is intended to compensate more difficult work with higher wages.
   (C) Pauline expects to be promoted to a higher-paying position.
   (D) Lorraine was paid more than either woman expected Lorraine to be paid.
   (E) Pauline has fewer years of experience in her current job than Lorraine has in hers.

8. Scientists warn of a global warming, a "greenhouse effect" resulting from increased atmospheric pollutants, including carbon dioxide from the burning of wood, coal, and oil. A coal-industry spokesperson says that the effect need not cause concern in the near future if, as some scientists believe, the Earth faces another ice age within the next thousand years, since each calamity could cancel out the other.

   Which of the following, if true, casts the most serious doubt on the conclusion of the spokesperson?

   (A) There is a generally cyclical pattern in the recurrence of ice ages on Earth.
   (B) The disastrous results of the greenhouse effect have begun to occur and will probably intensify within the next fifty years.
   (C) Trees absorb some of the carbon dioxide in the lower atmosphere and produce oxygen, which is not a pollutant.
   (D) Much of the carbon dioxide currently being produced comes not from coal but from the burning of trees cleared from large areas of tropical rain forest.
   (E) The greenhouse effect is a scientific conjecture based on incomplete data about gases in the upper atmosphere and on a theory about how those gases could affect the heat from the Sun.

9. Although part of the ivory available on world markets was taken from wild elephants that were killed illegally, some ivory is derived from sources that nearly all nations define as legal, such as elephants that have died natural deaths. The world's few remaining wild elephant herds, therefore, are not endangered when those buying ivory at wholesale make a serious effort to limit their purchases to such legal ivory.

   The argument above depends on the assumption that

   (A) wholesale buyers attempting to limit their purchases to legal ivory can reliably distinguish legal from illegal ivory
   (B) the demand for products made from legal ivory will continue to grow in the near future
   (C) there are currently fewer wholesale sources of legal ivory in the world than there are of illegal ivory
   (D) wholesale buyers of ivory products are generally unaware of the reasons for the dwindling world supply of ivory
   (E) a continued supply of legal ivory is ensured because elephants reproduce in captivity

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Questions 10-14

Ten persons will watch a Ping-Pong match. The ten persons will be seated in two rows of five seats that face each other along the two long sides of the rectangular Ping-Pong table. The seats are numbered consecutively from 1 to 10 with seats 1 through 5 on one side of the table and seats 6 through 10 on the other side, with seat 6 opposite seat 5. Five of the ten observers are men—Frank, George, Henry, Juan, and Len—and five of the observers are women—Mary, Rita, Susan, Trudy, and Yvonne. The seating is governed by the following rules:

On each long side of the table, no more than two consecutive seats can be occupied by men.
Trudy cannot sit beside Henry.
Frank cannot sit beside George.
Mary must sit beside Rita.
Henry must sit beside Juan.

10. Which of the following can be the arrangement of people in seats 1 through 5 ?

	Seat 1	Seat 2	Seat 3	Seat 4	Seat 5
(A)	Frank	Henry	Juan	Mary	Rita
(B)	Frank	George	Mary	Trudy	Len
(C)	Len	Mary	Rita	Juan	Henry
(D)	Mary	George	Rita	Yvonne	Len
(E)	Susan	Frank	Trudy	Henry	Juan

11. If Juan is in seat 7, Henry is in seat 8, and Frank is in seat 10, which of the following can be in seat 9 ?

(A) Len
(B) Mary
(C) Rita
(D) Trudy
(E) Yvonne

12. If George, Yvonne, and Juan are in seats 1 through 3, respectively, which of the following must be in seat 5 ?

(A) Frank
(B) Len
(C) Rita
(D) Susan
(E) Trudy

13. If Trudy, Susan, Frank, Len, and Yvonne are in seats 1 through 5, respectively, then George must be either in seat

(A) 6 or in seat 8
(B) 6 or in seat 10
(C) 7 or in seat 10
(D) 8 or in seat 9
(E) 8 or in seat 10

14. If as many women as possible are seated on the side that has seats numbered 1 through 5, which of the following statements must be true?

(A) Seat 3 is occupied by a man.
(B) Seat 8 is occupied by a woman.
(C) Seats 1 and 2 are each occupied by a woman.
(D) Seats 4 and 5 are each occupied by a woman.
(E) Seats 5 and 6 are each occupied by a woman.

GO ON TO THE NEXT PAGE.

Questions 15-18

The mixing vat in a factory receives liquid ingredients through 6 separate valves—labeled R, S, T, U, Y, and Z—each of which has exactly two settings: open and closed. The mixing-vat operator must ensure that each valve is set open or closed according to the following conditions:

If T is open, both S and Z must be closed.
R and Z cannot both be closed at the same time.
If Y is closed, Z must also be closed.
S and U cannot both be open at the same time.

15. If Z is open, which of the following must be true?

(A) R is open.
(B) S is open.
(C) T is open.
(D) U is open.
(E) Y is open.

16. If R is closed and U is open, which of the following must be true?

(A) S is open.
(B) T is open.
(C) T is closed.
(D) Y is closed.
(E) Z is closed.

17. If the maximum number of valves that can be closed at the same time are closed, which of the following must be true?

(A) R is open.
(B) S is open.
(C) T is open.
(D) Z is open.
(E) All valves are closed.

18. Which of the following, if given to the mixing-vat operator as an instruction, would NOT determine the setting of any other valve?

(A) S must be open.
(B) T must be open.
(C) U must be open.
(D) S must be closed.
(E) Y must be closed.

GO ON TO THE NEXT PAGE.

Questions 19-22

A set designer will select colors for six sets that will be used for six consecutive scenes of a ballet, with each scene having a single set. The artistic director has selected eight paint colors—gold, mauve, olive, pink, silver, tan, white, and yellow—and has asked the designer to use those colors according to the following specifications:

No color can be chosen for more than one set.
Sets in scenes 1 and 4 will be painted partly one color and partly another color; sets in the other four scenes will each be painted a single color.
If gold is chosen for the set in any scene, silver must also be chosen for the set in that scene.
Pink and olive are never used in the same scene as each other.
Tan is chosen for the set in the scene immediately following the scene for which white is chosen, and neither of these colors is used in the same scene as any other color.

19. If yellow is chosen for scene 2 and silver is one of the colors chosen for scene 4, which of the following must be one of the colors chosen for scene 1 ?

(A) Gold
(B) Mauve
(C) Olive
(D) Pink
(E) White

20. If olive is chosen for scene 5, which of the following must be true?

(A) Gold is chosen for scene 1.
(B) Mauve is chosen for scene 4.
(C) Pink is chosen for scene 2.
(D) Tan is chosen for scene 3.
(E) Yellow is chosen for scene 4.

21. If white is chosen for scene 5, which of the following can be true?

(A) Gold is chosen for scene 2.
(B) Mauve is chosen for scene 6.
(C) Pink is chosen for scene 6.
(D) Mauve is chosen for scene 2, and yellow is chosen for scene 3.
(E) Olive is chosen for scene 2, and yellow is chosen for scene 3.

22. For scene 2, the designer can select a color from a maximum of how many acceptable colors?

(A) One
(B) Two
(C) Three
(D) Four
(E) Five

GO ON TO THE NEXT PAGE.

23. The result of flipping an evenly weighted, or "fair," coin, a process commonly thought to be random, is, in fact, well determined by the impulse given the coin and by the height above the floor from which the coin starts. Yet it is difficult to predict the result of a fair coin flip.

Which of the following, if true, contributes most to an explanation of why the outcome of a coin flip is difficult to predict even though it is well determined?

(A) Coin flipping has been used as a prime example of a random process for decades.
(B) The result of flipping an unevenly weighted coin can be predicted with great accuracy.
(C) If the impulses of coin flippings remain perfectly constant, the results are determined only by the height from which the coin falls.
(D) An accurate prediction of the result of a coin flip requires extraordinarily precise estimation of height and impulse.
(E) That the results of coin flipping are well determined runs counter to the randomness that physicists have been finding in more and more processes once thought to be determined.

24. Police found that ninety percent of the burglaries and attempted burglaries over a five-year period in the city of Crowther occurred in houses that did not have burglar alarm systems. The police concluded that, in Crowther, the presence of a burglar alarm system is usually effective as a deterrent to burglary.

The conclusion reached by the police presupposes which of the following?

(A) The burglars entered houses only when they thought the occupants were away or asleep.
(B) The burglars entered houses that had burglar alarm systems only when they anticipated finding particularly valuable goods.
(C) When they entered a house that had no burglar alarm system, the burglars could take more time to search for valuables.
(D) Before they entered a house, the burglars could usually tell whether or not it had a burglar alarm system.
(E) The difference in the burglary rate between houses that had burglar alarm systems and those that did not had remained constant during the five-year period.

25. Partha has withdrawn its troops from Baltia after five years of occupation. Earlier this year the country of Cardena began shipping mules to Baltia's resistance fighters to facilitate transport of weapons across Baltia's mountains to the battle areas. Cardena's diplomats now claim that without Cardena's aid to Baltia's resistance fighters, Partha would not have withdrawn.

Which of the following, if true, casts the most serious doubt on the accuracy of the assertion of Cardena's diplomats?

(A) No precise figures are available concerning the number of mules shipped to Baltia.
(B) During the past year, Cardena shipped weapons and food, as well as mules, to resistance fighters in Baltia.
(C) Last year a new government took power in Partha and decided that national interests were not served by the occupation of Baltia.
(D) Two years ago Partha had no plans to reduce its forces in Baltia.
(E) Resistance fighters in Baltia fought for five years against Partha's occupying troops.

FOR GENERAL TEST 8 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 1			Section 5		
Number	Answer	P+	Number	Answer	P+
1	B	94	1	D	94
2	A	94	2	A	93
3	A	71	3	B	80
4	C	64	4	C	56
5	E	55	5	D	78
6	D	43	6	D	40
7	E	53	7	E	15
8	A	90	8	D	93
9	A	79	9	B	84
10	D	69	10	D	90
11	B	59	11	C	61
12	D	44	12	E	58
13	B	41	13	A	53
14	D	31	14	B	38
15	D	27	15	C	29
16	E	27	16	E	19
17	A	92	17	C	86
18	C	53	18	B	49
19	C	34	19	A	88
20	C	84	20	B	54
21	B	58	21	D	27
22	A	68	22	C	47
23	B	81	23	C	71
24	C	59	24	D	81
25	E	49	25	E	40
26	A	34	26	A	58
27	E	23	27	D	32
28	C	87	28	A	92
29	E	84	29	B	93
30	E	60	30	E	82
31	D	75	31	C	68
32	C	76	32	A	64
33	E	58	33	C	57
34	B	37	34	A	33
35	B	45	35	E	40
36	E	37	36	E	37
37	D	26	37	C	25
38	A	20	38	D	29

QUANTITATIVE ABILITY					
Section 2			Section 6		
Number	Answer	P+	Number	Answer	P+
1	B	93	1	A	91
2	C	83	2	B	82
3	C	83	3	A	82
4	A	87	4	B	74
5	D	89	5	D	68
6	A	78	6	A	77
7	B	77	7	D	70
8	D	74	8	A	61
9	D	56	9	C	46
10	B	60	10	D	47
11	D	68	11	C	49
12	A	38	12	C	35
13	C	47	13	B	26
14	C	27	14	C	37
15	A	20	15	C	26
16	E	81	16	D	93
17	B	80	17	D	81
18	A	63	18	A	80
19	D	57	19	B	75
20	E	49	20	B	70
21	E	92	21	D	70
22	D	71	22	B	56
23	A	71	23	B	66
24	C	55	24	A	56
25	B	37	25	E	34
26	A	62	26	C	57
27	C	44	27	E	45
28	E	41	28	C	40
29	E	32	29	B	32
30	D	27	30	E	15

ANALYTICAL ABILITY					
Section 3			Section 7		
Number	Answer	P+	Number	Answer	P+
1	E	91	1	E	80
2	B	80	2	C	77
3	D	90	3	E	72
4	D	77	4	A	62
5	E	79	5	D	61
6	C	68	6	C	51
7	A	69	7	B	79
8	C	81	8	B	67
9	D	57	9	A	83
10	D	78	10	C	81
11	A	61	11	E	86
12	D	64	12	D	82
13	B	77	13	B	64
14	A	70	14	B	46
15	E	62	15	E	50
16	C	53	16	C	49
17	B	35	17	A	44
18	A	49	18	D	52
19	D	32	19	B	55
20	A	63	20	D	28
21	E	46	21	E	25
22	E	31	22	E	18
23	B	44	23	D	63
24	B	59	24	D	73
25	B	41	25	C	59

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 8 ONLY AND THE PERCENTS BELOW*

Raw Score	Verbal Scaled Score	Verbal % Below	Quantitative Scaled Score	Quantitative % Below	Analytical Scaled Score	Analytical % Below	Raw Score	Verbal Scaled Score	Verbal % Below	Quantitative Scaled Score	Quantitative % Below	Analytical Scaled Score	Analytical % Below
73-76	800	99					39	430	34	610	60	650	79
72	790	99					38	420	31	600	58	640	77
71	770	99					37	420	31	590	56	630	73
70	760	99					36	410	28	580	53	610	69
							35	400	25	560	48	600	66
69	750	98					34	390	22	550	46	580	60
68	730	97					33	380	20	540	43	570	58
67	720	96					32	370	17	520	39	560	55
66	710	96					31	360	15	510	37	540	49
65	700	95					30	360	15	500	34	530	46
64	680	93											
63	670	92					29	350	13	480	30	520	43
62	660	90					28	340	11	470	27	500	37
61	650	89					27	330	9	460	25	490	35
60	640	87	800	97			26	320	8	450	23	470	30
							25	320	8	430	19	460	28
59	630	86	800	97			24	310	6	420	17	440	23
58	620	84	800	97			23	300	5	410	15	430	21
57	610	82	790	95			22	290	4	390	12	420	19
56	590	79	780	93			21	280	3	380	11	410	17
55	580	76	780	93			20	270	2	370	9	390	13
54	570	74	770	92									
53	560	71	760	90			19	260	2	350	7	380	12
52	550	69	750	88			18	250	1	340	6	370	11
51	540	66	740	86			17	240	1	330	5	350	8
50	530	64	730	84	800	98	16	230	1	310	3	340	7
							15	220	1	290	2	330	6
49	530	64	720	82	800	98	14	200	1	280	2	310	4
48	520	61	710	80	800	98	13	200	1	260	1	300	3
47	510	58	700	79	780	97	12	200	1	240	1	290	3
46	500	55	690	76	760	96	11	200	1	230	1	270	2
45	490	53	680	75	750	95	10	200	1	210	1	260	1
44	480	50	670	73	730	93							
43	470	47	660	70	710	90	9	200	1	200	1	250	1
42	460	43	650	68	700	89	8	200	1	200	1	240	1
41	450	40	640	66	680	85	7	200	1	200	1	230	1
40	440	37	620	62	670	83	6	200	1	200	1	210	1
							5	200	1	200	1	210	1
							0-4	200	1	200	1	200	1

*Percent scoring below the scaled score is based on the performance of 1,040,336 examinees who took the General Test between October 1, 1988, and September 30, 1991. This percent below information is used for score reports during the 1992-93 testing year.

TEST 9

SECTION 1
Time—30 minutes
25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-6

Two maps are being designed. One will show subway lines; the other will show bus routes. There are three subway lines and four bus routes, and each line or route must be represented on the maps by a color used to represent it only. The colors available to the designer of the maps are blue, green, orange, purple, red, tan, and yellow. Any assignment of colors to lines and routes is acceptable provided the following conditions are met:

Blue cannot be used on the same map as purple.
Orange cannot be used on the same map as red, nor on the same map as yellow.

1. If blue is used on the subway map, which of the following must be true?
   (A) Orange is used on the subway map.
   (B) Yellow is used on the subway map.
   (C) Purple is used on the bus map.
   (D) Green is used on the bus map.
   (E) Red is used on the bus map.

2. If red is used on the bus map, which of the following colors must be used on the subway map?
   (A) Blue
   (B) Orange
   (C) Purple
   (D) Tan
   (E) Yellow

3. If yellow and purple are used on the subway map, the third color used on that map must be
   (A) blue
   (B) green
   (C) orange
   (D) red
   (E) tan

4. If red and blue are used on the bus map, which of the following could be the other two colors used on that map?
   (A) Green and purple
   (B) Green and tan
   (C) Green and yellow
   (D) Orange and tan
   (E) Purple and yellow

5. If green is not used on the same map as blue, nor on the same map as yellow, which of the following must be true?
   (A) Blue is used on the subway map.
   (B) Blue is used on the bus map.
   (C) Green is used on the same map as red.
   (D) Purple is used on the same map as orange.
   (E) Tan is used on the same map as red.

6. There will be only one acceptable assignment of colors to each of the two maps if which of the following conditions is added to the original ones?
   (A) Purple and tan must be used on the subway map.
   (B) Green and purple must be used on the bus map.
   (C) Blue cannot be used on the same map as green.
   (D) Green cannot be used on the same map as yellow.
   (E) Purple cannot be used on the same map as red.

GO ON TO THE NEXT PAGE.

7. The claim that learning computer programming is a sure way to a bright future is analogous to the contention, popular a few years ago, that if one wanted a successful career, one should study law. Now, of course, there are more law students graduating than the market can absorb.

   The point of the analogy above is that

   (A) lawyers are making increasing use of computers in their work
   (B) computer programmers will increasingly need the services of lawyers
   (C) there will soon be more jobs for lawyers than there are now
   (D) there will soon be more programming students graduating than there are jobs for them
   (E) graduating law students and programming students will soon be competing with each other for the same jobs

8. Whenever Ned is outdoors and the sun is shining, Ned wears his sunglasses. Whenever Ned is outdoors and the sun is not shining, Ned carries his sunglasses in his pocket. Sometimes the sun is shining when Ned is not outdoors.

   If the statements above are true and Ned is not wearing his sunglasses, which of the following statements must also be true?

   (A) Ned is carrying his sunglasses in his pocket.
   (B) Ned is not outdoors.
   (C) Ned is not outdoors and the sun is not shining.
   (D) Ned is not outdoors and/or the sun is not shining.
   (E) Ned is outdoors and/or the sun is not shining.

9. Between 1950 and 1965, the federal government spent one-third more on research and development than industry did from its own funds. In 1980, for the first time, industry spent more on research and development than the federal government did. Representatives of industry claim that these statistics show an increased commitment on the part of industry to develop competitive products.

   Which of the following, if true, would help to refute the claim of the representatives of industry?

   (A) In 1980 the federal government spent half as much on research and development as it spent in 1965.
   (B) Between 1965 and 1980, industry in the United States experienced increasing competition from industry in other countries.
   (C) In 1979 the federal government shifted research allocations from pharmaceuticals to electronics.
   (D) Since 1965, industry has developed major product innovations, such as the personal computer.
   (E) Before 1985, money spent by industry on research and development was not taxed by the federal government.

GO ON TO THE NEXT PAGE.

Questions 10-13

Seven offices in an office building are to be painted. The offices, which are on one side of a hallway, are numbered consecutively, one to seven, from the front of the building to the back. Each office is to be painted one color only according to the following conditions:

Two offices must be painted white; two offices must be painted blue; two offices must be painted green; and one office must be painted yellow.
The two offices painted green must be next to each other.
The two offices painted blue cannot be next to each other.
The office painted yellow cannot be next to an office painted white.
Office 3 must be painted white.

10. If office 2 is painted green, which of the following offices must also be painted green?

(A) 1
(B) 3
(C) 4
(D) 5
(E) 6

11. If office 5 is painted white, which of the following could be true?

(A) Office 1 is painted blue.
(B) Office 2 is painted yellow.
(C) Office 4 is painted green.
(D) Office 4 is painted yellow.
(E) Office 6 is painted blue.

12. If office 4 is painted white and an office that is painted green is next to an office that is painted white, which of the following must be true?

(A) Office 1 is painted green.
(B) Office 1 is painted yellow.
(C) Office 5 is painted blue.
(D) Office 6 is painted yellow.
(E) Office 7 is painted blue.

13. Which of the following conditions, when combined with the original conditions, has the consequence of completely determining the color that each office is painted?

(A) Office 1 must be painted yellow.
(B) Office 1 must be painted green.
(C) Office 4 must be painted blue.
(D) Office 6 must be painted white.
(E) Office 6 must be painted blue.

GO ON TO THE NEXT PAGE.

Questions 14-17

A mail carrier must deliver mail by making a stop at each of six buildings: K, L, M, O, P, and S. Mail to be delivered is of two types, ordinary mail and priority mail. The delivery of both types of mail is subject to the following conditions:

Regardless of the type of mail to be delivered, mail to P and mail to S must be delivered before mail to M is delivered.

Regardless of the type of mail to be delivered, mail to L and mail to K must be delivered before mail to S is delivered.

Mail to buildings receiving some priority mail must be delivered, as far as the above conditions permit, before mail to buildings receiving only ordinary mail.

14. If K is the only building receiving priority mail, which of the following lists the buildings in an order, from first through sixth, in which they can receive their mail?

(A) L, K, P, S, O, M
(B) L, K, S, P, M, O
(C) K, L, P, M, S, O
(D) K, P, L, S, O, M
(E) O, K, L, P, S, M

15. If L, M, and S are each receiving priority mail, which of the following lists the buildings in an order, from first to sixth, in which they must receive their mail?

(A) K, L, P, S, O, M
(B) L, K, O, P, S, M
(C) L, K, S, P, M, O
(D) M, L, S, P, K, O
(E) S, L, M, P, K, O

16. If the sequence of buildings to which mail is delivered is O, P, L, K, S, M and if S is receiving priority mail, which of the following is a complete and accurate list of buildings that must also be receiving priority mail?

(A) O, L
(B) O, P
(C) P, L
(D) P, M
(E) O, P, L, K

17. If only one building is to receive priority mail, and, as a result, O can be no earlier than fourth in the order of buildings, which of the following must be the building receiving priority mail that day?

(A) K
(B) L
(C) M
(D) P
(E) S

GO ON TO THE NEXT PAGE.

Questions 18-22

Six musicians—Ann, Betsy, Gordon, Juan, Marian, and Ted—are planning to perform a program consisting entirely of three quartets. Each quartet requires two violins, one cello, and a piano.

Each person must play in at least one quartet, and each person can play, at most, one instrument in a quartet. No person can play the same type of instrument (violin, cello, or piano) in two successive quartets.

Ann plays violin only, and must play in the first quartet.
Betsy plays violin or piano.
Gordon plays violin or cello.
Juan plays cello only.
Marian plays violin or piano.
Ted plays piano only.

18. Any of the following musicians could play in the second quartet EXCEPT

(A) Ann
(B) Betsy
(C) Gordon
(D) Juan
(E) Ted

19. If Juan plays cello in the first quartet, which of the following must be true?

(A) Betsy plays piano in the first quartet.
(B) Gordon plays cello in the second quartet.
(C) Gordon plays cello in the third quartet.
(D) Juan plays cello in the second quartet.
(E) Ted plays piano in the first quartet.

20. If Ann, Betsy, Gordon, and Juan play in the first quartet, which of the following could be the group of musicians playing in the second quartet?

(A) Ann, Betsy, Gordon, and Marian
(B) Ann, Gordon, Marian, and Ted
(C) Betsy, Gordon, Juan, and Marian
(D) Betsy, Gordon, Marian, and Ted
(E) Betsy, Juan, Marian, and Ted

21. Which of the following groups of musicians includes all those, and only those, who CANNOT be scheduled to play in all three quartets, no matter what schedule is devised?

(A) Ann, Betsy, and Gordon
(B) Ann, Juan, and Ted
(C) Betsy, Gordon, and Marian
(D) Betsy, Juan, and Marian
(E) Gordon, Juan, and Ted

22. Unavailability of which of the following musicians would still permit scheduling the five remaining players so that the proposed program could be performed?

(A) Betsy
(B) Gordon
(C) Juan
(D) Marian
(E) Ted

GO ON TO THE NEXT PAGE.

23. It is impossible to believe scientific predictions that a long "nuclear winter" would envelop the Earth as a result of nuclear war. Atmospheric scientists and weather experts cannot reliably and accurately predict tomorrow's weather. Yet the effect of nuclear explosions on local and worldwide atmospheric conditions must follow the same laws that control everyday weather changes. If the weather cannot be predicted with present knowledge, neither can a nuclear-winter scenario.

Which of the following, if true, would most seriously weaken the argument made above that if scientists cannot reliably predict the daily weather, their predictions of a "nuclear winter" cannot be believed?

(A) The scientific theory of a nuclear winter uses data that is available to those who forecast the daily weather.
(B) Scientists' predictions about a nuclear winter are necessarily speculative, since they cannot be verified by harmless experimentation.
(C) Weather forecasters usually do not insist that their predictions are infallible.
(D) Scientific predictions of catastrophic natural events such as volcanic eruptions and earthquakes usually have less reliability than everyday weather predictions.
(E) The scientific theory of a nuclear winter is concerned with drastic climatic changes rather than day-to-day fluctuations in the weather.

24. Carla and Joel took five courses together but achieved the same grade in only one of the courses—history. Each course was graded on a scale ranging from 60 to 100.

Which of the following statements allows one to determine whether the average of the grades Carla achieved in the five courses was higher than the average of the grades Joel achieved in those courses?

(A) Carla's lowest grade was in history, but Joel's lowest grade was in math.
(B) Joel's highest grade was higher than Carla's highest grade.
(C) Carla achieved higher grades than Joel in three courses.
(D) Carla's lowest grade and Joel's highest grade were the same.
(E) Joel's lowest grade and Carla's highest grade were for the same course.

25. In the 1960's, long-term studies of primate behavior often used as subjects tamarins, small monkeys that were thought ideal because they require only small cages, breed frequently, and grow quickly. Field studies were not used because they were costly and difficult. Tamarins were kept caged in male-female pairs, because otherwise, serious fights erupted between unrelated females. On the basis of the fact that breeding occurred, tamarins were viewed as monogamous.

The view taken by the researchers concerning the monogamy of tamarins depended on a questionable assumption. Which of the following could have served as that assumption?

(A) The suppression of fighting between related females serves to protect their common genetic inheritance.
(B) Adult male tamarins contribute to the care of tamarin infants.
(C) The social system of tamarins requires monogamous pairing.
(D) Male tamarin monkeys do not display aggressive behavior in the wild.
(E) The way the tamarins were kept in cages did not affect their mating behavior.

SECTION 2

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Though some of the information the author reveals about Russian life might surprise Americans, her major themes are ------- enough.

   (A) familiar (B) thorough (C) vital
   (D) original (E) interesting

2. In the early twentieth century, the discovery of radium ------- the popular imagination; not only was its discoverer, Marie Curie, idolized, but its market value ------- that of the rarest gemstone.

   (A) stormed. .sank to
   (B) horrified. .approached
   (C) taxed. .was equal to
   (D) enflamed. .exceeded
   (E) escaped. .was comparable to

3. The president's secretary and his chief aide adored him, and both wrote obsessively ------- personal memoirs about him; unfortunately, however, ------- does not make for true intimacy.

   (A) fatuous. .frankness
   (B) devoted. .idolatry
   (C) garrulous. .confidentiality
   (D) candid. .discretion
   (E) rancorous. .criticism

4. Despite claims that his philosophy can be traced to ------- source, the philosophy in fact draws liberally on several traditions and methodologies and so could justifiably be termed -------.

   (A) a particular. .consistent
   (B) a schematic. .multifaceted
   (C) a dominant. .cogent
   (D) an authoritative. .derivative
   (E) a single. .eclectic

5. Du Bois' foreign trips were the highlight, not the -------, of his travels; he was habitually on the go across and around the United States.

   (A) idiosyncrasy (B) result (C) precursor
   (D) culmination (E) totality

6. Business forecasts usually prove reasonably accurate when the assumption that the future will be much like the past is -------; in times of major ------- in the business environment, however, forecasts can be dangerously wrong.

   (A) specified. .discontinuities
   (B) questioned. .surges
   (C) contradicted. .improvements
   (D) entertained. .risks
   (E) satisfied. .shifts

7. It is almost always desirable to increase the yield of a crop if ------- increases are not also necessary in energy, labor, and other inputs of crop production.

   (A) predetermined (B) commensurate
   (C) compatible (D) measured (E) equivocal

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. MISER : STINGY :: (A) porter : strong
(B) rebel : idle (C) sage : docile
(D) friend : snide (E) loner : solitary

9. AQUEDUCT : WATER :: (A) capillary : saliva
(B) artery : blood (C) esophagus : breath
(D) corridor : aircraft (E) tanker : fluids

10. ENZYME : CATALYST :: (A) vaccine : allergy
(B) bacterium : microbe (C) gland : muscle
(D) vein : organ (E) neuron : corpuscle

11. LIEN : CLAIM ::
(A) brief : investigation
(B) mortgage : interest
(C) foreclosure : pleading
(D) garnishment : presumption
(E) subpoena : command

12. VERBOSITY : WORDS ::
(A) harmoniousness : relationships
(B) floridness : embellishments
(C) interrogation : answers
(D) supposition : proposals
(E) condemnation : acts

13. QUIXOTIC : IDEALISTIC ::
(A) churlish : polite
(B) whimsical : steady
(C) disinterested : impartial
(D) touchy : sensitive
(E) central : random

14. PREEMPT : PRECEDENCE ::
(A) dissemble : diplomacy
(B) superintend : culpability
(C) preside : arbitration
(D) acquire : possession
(E) divest : implication

15. MALINGER : AIL :: (A) study : learn
(B) qualify : achieve (C) sneer : respect
(D) flatter : appreciate (E) clash : resolve

16. ARBOREAL : TREES :: (A) terrestrial : plains
(B) amphibious : rivers (C) herbaceous : plants
(D) subterranean : caves (E) sidereal : stars

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Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Zooplankton, tiny animals adapted to an existence in the ocean, have evolved clever mechanisms for obtaining their food, miniscule phytoplankton (plant plankton). A very specialized feeding adaptation in zooplankton is that of the tadpolelike appendicularian who lives in a walnut-sized (or smaller) balloon of mucus equipped with filters that capture and concentrate phytoplankton. The balloon, a transparent structure that varies in design according to the type of appendicularian inhabiting it, also protects the animal and helps to keep it afloat. Water containing phytoplankton is pumped by the appendicularian's muscular tail into the balloon's incurrent filters, passes through the feeding filter where the appendicularian sucks the food into its mouth, and then goes through an exit passage. Found in all the oceans of the world, including the Arctic Ocean, appendicularians tend to remain near the water's surface where the density of phytoplankton is greatest.

17. It can be inferred from the passage that which of the following is true of appendicularians?
    (A) They are exclusively carnivorous.
    (B) They have more than one method of obtaining food.
    (C) They can tolerate frigid water.
    (D) They can disguise themselves by secreting mucus.
    (E) They are more sensitive to light than are other zooplankton.

18. The author is primarily concerned with
    (A) explaining how appendicularians obtain food
    (B) examining the flotation methods of appendicularians
    (C) mapping the distribution of appendicularians around the world
    (D) describing how appendicularians differ from other zooplankton
    (E) comparing the various types of balloons formed by appendicularians

19. According to the passage, all of the following are descriptive of appendicularians EXCEPT
    (A) tailed (B) vegetarian (C) small-sized (D) single-celled (E) ocean-dwelling

20. The passage suggests that appendicularians tend to remain in surface waters because they
    (A) prefer the warmer water near the surface
    (B) are unable to secrete mucus at the lower levels of the ocean
    (C) use the contrast of light and shadow at the surface to hide from predators
    (D) live in balloons that cannot withstand the water pressure deeper in the ocean
    (E) eat food that grows more profusely near the surface

GO ON TO THE NEXT PAGE.

Students of United States history, seeking to identify the circumstances that encouraged the emergence of feminist movements, have thoroughly investigated the mid-nineteenth-century American economic and social conditions that affected the status of women. These historians, however, have analyzed less fully the development of specifically feminist ideas and activities during the same period. Furthermore, the ideological origins of feminism in the United States have been obscured because, even when historians did take into account those feminist ideas and activities occurring within the United States, they failed to recognize that feminism was then a truly international movement actually centered in Europe. American feminist activists who have been described as "solitary" and "individual theorists" were in reality connected to a movement—utopian socialism—which was already popularizing feminist ideas in Europe during the two decades that culminated in the first women's rights conference held at Seneca Falls, New York, in 1848. Thus, a complete understanding of the origins and development of nineteenth-century feminism in the United States requires that the geographical focus be widened to include Europe and that the detailed study already made of social conditions be expanded to include the ideological development of feminism.

The earliest and most popular of the utopian socialists were the Saint-Simonians. The specifically feminist part of Saint-Simonianism has, however, been less studied than the group's contribution to early socialism. This is regrettable on two counts. By 1832 feminism was the central concern of Saint-Simonianism and entirely absorbed its adherents' energy; hence, by ignoring its feminism, European historians have misunderstood Saint-Simonianism. Moreover, since many feminist ideas can be traced to Saint-Simonianism, European historians' appreciation of later feminism in France and the United States remained limited.

Saint-Simon's followers, many of whom were women, based their feminism on an interpretation of his project to reorganize the globe by replacing brute force with the rule of spiritual powers. The new world order would be ruled together by a male, to represent reflection, and a female, to represent sentiment. This complementarity reflects the fact that, while the Saint-Simonians did not reject the belief that there were innate differences between men and women, they nevertheless foresaw an equally important social and political role for both sexes in their utopia.

Only a few Saint-Simonians opposed a definition of sexual equality based on gender distinction. This minority believed that individuals of both sexes were born similar in capacity and character, and they ascribed male-female differences to socialization and education. The envisioned result of both currents of thought, however, was that women would enter public life in the new age and that sexual equality would reward men as well as women with an improved way of life.

21. It can be inferred that the author considers those historians who describe early feminists in the United States as "solitary" to be

(A) insufficiently familiar with the international origins of nineteenth-century American feminist thought
(B) overly concerned with the regional diversity of feminist ideas in the period before 1848
(C) not focused narrowly enough in their geographical scope
(D) insufficiently aware of the ideological consequences of the Seneca Falls conference
(E) insufficiently concerned with the social conditions out of which feminism developed

22. According to the passage, which of the following is true of the Seneca Falls conference on women's rights?

(A) It was primarily a product of nineteenth-century Saint-Simonian feminist thought.
(B) It was the work of American activists who were independent of feminists abroad.
(C) It was the culminating achievement of the utopian socialist movement.
(D) It was a manifestation of an international movement for social change and feminism.
(E) It was the final manifestation of the women's rights movement in the United States in the nineteenth century.

23. The author's attitude toward most European historians who have studied the Saint-Simonians is primarily one of

(A) approval of the specific focus of their research
(B) disapproval of their lack of attention to the issue that absorbed most of the Saint-Simonians' energy after 1832
(C) approval of their general focus on social conditions
(D) disapproval of their lack of attention to links between the Saint-Simonians and their American counterparts
(E) disagreement with their interpretation of the Saint-Simonian belief in sexual equality

GO ON TO THE NEXT PAGE.

24. The author mentions all of the following as characteristic of the Saint-Simonians EXCEPT:

(A) The group included many women among its members.
(B) The group believed in a world that would be characterized by sexual equality.
(C) The group was among the earliest European socialist groups.
(D) Most members believed that women should enter public life.
(E) Most members believed that women and men were inherently similar in ability and character.

25. It can be inferred from the passage that the Saint-Simonians envisioned a utopian society having which of the following characteristics?

(A) It would be worldwide.
(B) It would emphasize dogmatic religious principles.
(C) It would most influence the United States.
(D) It would have armies composed of women rather than of men.
(E) It would continue to develop new feminist ideas.

26. It can be inferred from the passage that the author believes that study of Saint-Simonianism is necessary for historians of American feminism because such study

(A) would clarify the ideological origins of those feminist ideas that influenced American feminism
(B) would increase understanding of a movement that deeply influenced the utopian socialism of early American feminists
(C) would focus attention on the most important aspect of Saint-Simonian thought before 1832
(D) promises to offer insight into a movement that was a direct outgrowth of the Seneca Falls conference of 1848
(E) could increase understanding of those ideals that absorbed most of the energy of the earliest American feminists

27. According to the passage, which of the following would be the most accurate description of the society envisioned by most Saint-Simonians?

(A) A society in which women were highly regarded for their extensive education
(B) A society in which the two genders played complementary roles and had equal status
(C) A society in which women did not enter public life
(D) A social order in which a body of men and women would rule together on the basis of their spiritual power
(E) A social order in which distinctions between male and female would not exist and all would share equally in political power

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. TOY: (A) think over seriously
(B) admire overtly (C) use sporadically
(D) praise unstintingly (E) covet irrationally

29. QUACK: (A) hard worker (B) true believer
(C) honest practitioner (D) careful employee
(E) experienced planner

30. FRINGE: (A) center (B) proximity
(C) breadth (D) outlet (E) continuity

31. FALLACIOUS: (A) safe (B) valid
(C) energetic (D) diverted (E) persuasive

32. CRYPTIC: (A) resonant (B) superficial
(C) unobjectionable (D) self-explanatory
(E) other-directed

33. RENT: (A) in abeyance (B) occupied
(C) undeserved (D) turned down
(E) made whole

34. CONSIDER: (A) activate (B) infer
(C) table (D) encourage (E) deter

35. TENUOUS: (A) finite (B) embedded
(C) convinced (D) substantial (E) proximate

36. MERCURIAL: (A) earthy (B) honest
(C) thoughtful (D) clumsy (E) constant

37. OPPROBRIUM: (A) good repute
(B) fair recompense (C) fidelity
(D) exposure (E) patience

38. VENERATION: (A) derision (B) blame
(C) avoidance (D) ostracism (E) defiance

SECTION 3

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

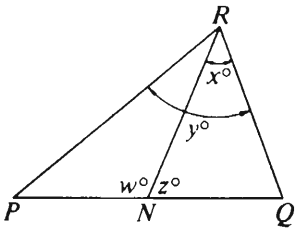
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

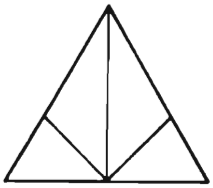
Examples 2-4 refer to $\triangle PQR$.

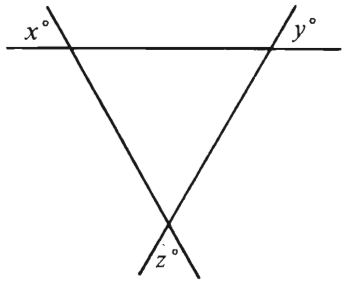


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

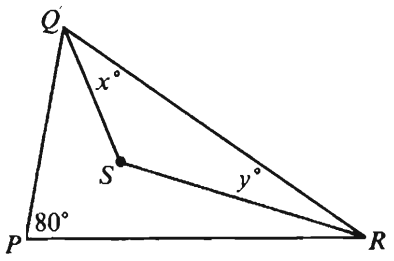
Column A	Column B
A hardware store purchased identical snow shovels at a cost of \$9 apiece and sold each of them for 20 percent above cost.	
1. The price at which the hardware store sold each shovel	\$10.80
$n + \frac{2}{5} = 5 + \frac{7}{5}$	
2. n	$6\frac{4}{5}$
$x < 0$	
3. $x - 1$	$1 - x$
	
4. The total number of triangles shown above	6
5. 3^4	4^3
$x + k = 8$ $x - k = 4$	
6. x	k

Column A	Column B
Carol is c centimeters tall, and Diane is d centimeters shorter than Carol. $(d > 0)$	
7. The sum of Carol's height and Diane's height	$2c$ centimeters
	
8. $x + y + z$	150
$n = 105.873$	
9. $\frac{n \times 10^3}{10^5}$	1

GO ON TO THE NEXT PAGE.

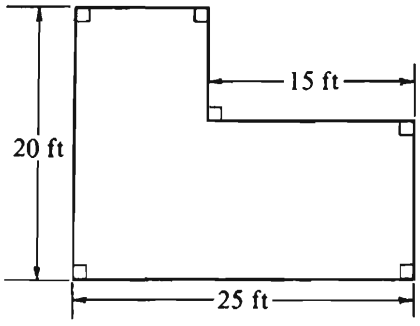
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Column A	Column B



Segment QS bisects $\angle PQR$ and segment RS bisects $\angle PRQ$.

10. x | y



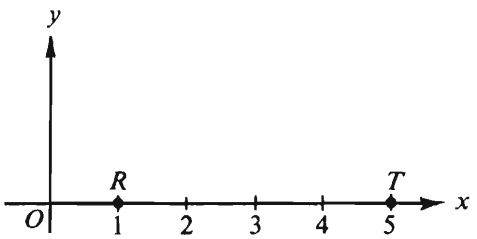
The figure represents the floor of a certain room.

11. The area of the floor | 350 square feet

Column A	Column B

$x^2 - 3x + 2 = 0$

12. Twice the sum of the roots of the equation | 6



Point S (not shown) lies above the x-axis such that $\triangle RST$ has area equal to 6.

13. The x-coordinate of point S | The y-coordinate of point S

14. $\frac{10^5}{5^3}$ | $2^5 \cdot 5^2$

$rs \neq 0$

15. $(r + s)^2$ | $r^2 + s^2$

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. If $9x - 3 = 15$, then $3x - 1 =$

(A) $\frac{5}{3}$

(B) 3

(C) 5

(D) 6

(E) 45

17. If the sum of 12, 15, and x is 45, then the product of 5 and $(x + 2)$ is

(A) 100
(B) 92
(C) 80
(D) 41
(E) 25

18. If the average (arithmetic mean) of two numbers is 20 and one of the numbers is x, what is the other number in terms of x?

(A) $40 - x$
(B) $40 - 2x$
(C) $20 + x$
(D) $20 - x$
(E) $20 - 2x$

19. $\frac{1}{\frac{1}{2}} + \frac{2}{\frac{2}{3}} + \frac{3}{\frac{3}{4}} =$

(A) $\frac{1}{9}$

(B) $\frac{13}{12}$

(C) $\frac{29}{12}$

(D) 8

(E) 9

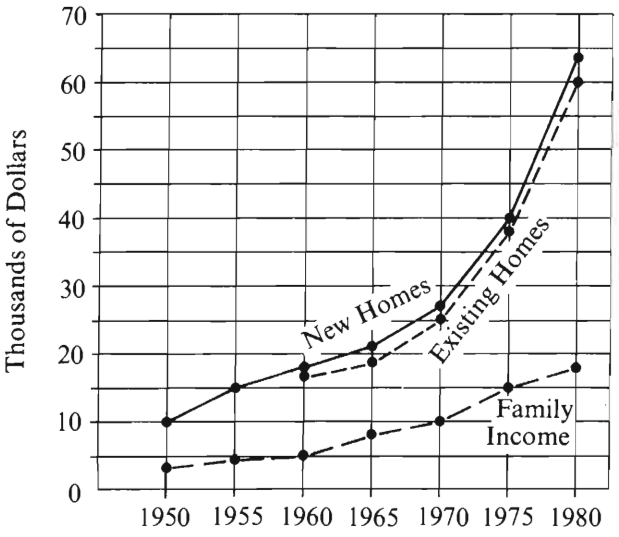
20. What is the area of a circular region that has circumference 8π?

(A) 4π
(B) 8π
(C) 16π
(D) 32π
(E) 64π

GO ON TO THE NEXT PAGE.

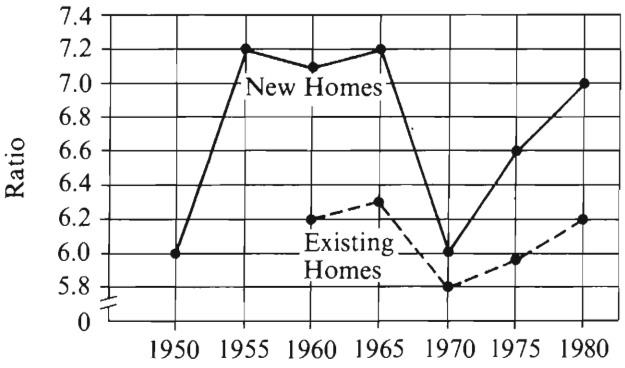
Questions 21-25 refer to the following graphs.

HOUSING PRICE AND FAMILY INCOME*



*median sale price and median family income

RATIO OF HOUSING PRICE TO PER CAPITA INCOME**



**Ratio $= \frac{\text{Housing Price (median sale price)}}{\text{Per Capita Income}}$

Note: Graphs drawn to scale.

21. Approximately what was the median sale price of an existing home in 1975 ?

(A) \$15,000
(B) \$35,000
(C) \$36,000
(D) \$38,000
(E) \$40,000

22. In 1980, what was the approximate difference between the median sale price of an existing home and the median family income?

(A) \$42,000
(B) \$45,000
(C) \$46,000
(D) \$46,500
(E) \$47,500

23. For which of the following years was the ratio of the median sale price of a new home minus the median sale price of an existing home to per capita income least?

(A) 1960
(B) 1965
(C) 1970
(D) 1975
(E) 1980

24. If in 1985 the per capita income was \$7,200 and the ratio of the median sale price of an existing home to per capita income was the same as in 1980, what was the median sale price of an existing home in 1985 ?

(A) \$50,040
(B) \$44,640
(C) \$11,600
(D) \$5,040
(E) \$1,160

25. By approximately what percent did the median sale price of a new home increase from 1955 to 1975 ?

(A) 26%

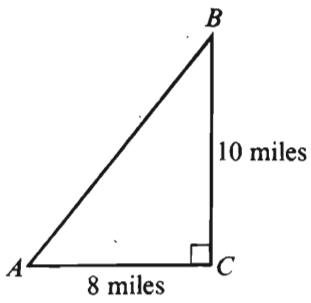
(B) $37\frac{1}{2}\%$

(C) $62\frac{1}{2}\%$

(D) 167%

(E) 267%

GO ON TO THE NEXT PAGE.



26. According to the figure above, traveling directly from point A to point B, rather than from point A to point C and then from point C to point B, would save approximately how many miles?

(A) 1
(B) 2
(C) 3
(D) 4
(E) 5

27. $0.50\% =$

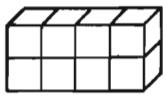
(A) $\frac{1}{500}$

(B) $\frac{1}{200}$

(C) $\frac{1}{50}$

(D) $\frac{1}{20}$

(E) $\frac{1}{2}$



28. The rectangular solid above is made up of eight cubes of the same size, each of which has exactly one face painted blue. What is the greatest fraction of the total surface area of the solid that could be blue?

(A) $\frac{1}{6}$

(B) $\frac{3}{14}$

(C) $\frac{1}{4}$

(D) $\frac{2}{7}$

(E) $\frac{1}{3}$

29. If $a > 0$, $b > 0$, and $c > 0$, $a + \dfrac{1}{b + \frac{1}{c}} =$

(A) $\dfrac{a + b}{c}$

(B) $\dfrac{ac + bc + 1}{c}$

(C) $\dfrac{abc + b + c}{bc}$

(D) $\dfrac{a + b + c}{abc + 1}$

(E) $\dfrac{abc + a + c}{bc + 1}$

30. The buyer of a certain mechanical toy must choose 2 of 4 optional motions and 4 of 5 optional accessories. How many different combinations of motions and accessories are available to the buyer?

(A) 8
(B) 11
(C) 15
(D) 20
(E) 30

SECTION 4

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Job failure means being fired from a job, being asked to resign, or leaving ------- to protect yourself because you had very strong evidence that one of the first two was ------- .

   (A) voluntarily. .impending
   (B) abruptly. .significant
   (C) knowingly. .operative
   (D) understandably. .pertinent
   (E) eventually. .intentional

2. The tone of Jane Carlyle's letter is guarded, and her feelings are always ------- by the wit and pride that made ------- plea for sympathy impossible for her.

   (A) masked. .a direct
   (B) bolstered. .a needless
   (C) controlled. .a circumspect
   (D) enhanced. .an intentional
   (E) colored. .an untimely

3. French folktales almost always take place within the basic ------- that correspond to the ------- setting of peasant life: on the one hand, the household and village and on the other, the open road.

   (A) contexts. .hierarchical
   (B) structures. .personal
   (C) frameworks. .dual
   (D) chronologies. .generic
   (E) narratives. .ambivalent

4. Nurturing the Royal Ballet's artistic growth while preserving its institutional stability has been difficult, because the claims of the latter seem inescapably to ------- development; apparently, attaining artistic success is simpler than ------- it.

   (A) ensure. .promoting
   (B) inhibit. .perpetuating
   (C) undermine. .resurrecting
   (D) modify. .appreciating
   (E) supplement. .confining

5. Inspired interim responses to hitherto unknown problems, New Deal economic strategems became ------- as a result of bureaucratization, their flexibility and adaptibility destroyed by their transformation into rigid policies.

   (A) politicized
   (B) consolidated
   (C) ossified
   (D) ungovernable
   (E) streamlined

6. Biologists ------- isolated oceanic islands like the Galapagos, because, in such small, laboratory-like settings, the rich hurly-burly of continental plant and animal communities is reduced to a scientifically ------- complexity.

   (A) explore. .diverse
   (B) desert. .manageable
   (C) exploit. .intimidating
   (D) reject. .intricate
   (E) prize. .tractable

7. The startling finding that variations in the rate of the Earth's rotation depend to an ------- degree on the weather has necessitated a complete ------- of the world's time-keeping methods.

   (A) unexpected. .overhaul
   (B) anticipated. .recalibration
   (C) indeterminate. .rejection
   (D) unobservable. .review
   (E) estimated. .acceptance

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. ORCHESTRA : INSTRUMENTAL ::
(A) choir : vocal (B) pianist : discordant
(C) trio : harmonic (D) singer : sacred
(E) band : martial

9. TROPHY : CONTESTANT :: (A) baton : runner
(B) pride : parent (C) book : bibliography
(D) loan : cashier (E) honors : student

10. LISTENER : EAVESDROPPER ::
(A) spectator : game (B) viewer : gazer
(C) observer : spy (D) speaker : chatterbox
(E) leader : demagogue

11. FIDGET : NERVOUSNESS :: (A) cringe : dread
(B) stall : frustration (C) regale : amusement
(D) doubt : consternation (E) nag : annoyance

12. DORMANT : INACTIVITY ::
(A) stark : ornateness (B) malleable : plasticity
(C) prone : uprightness (D) infuriating : tedium
(E) slack : excess

13. WAFT : PLUMMET :: (A) skim : glide
(B) dream : captivate (C) toss : catch
(D) flail : assault (E) meander : dash

14. PRUDISH : PROPRIETY ::
(A) fanatical : violence
(B) authoritative : evidence
(C) finicky : quality
(D) obstinate : accuracy
(E) fearful : comfort

15. POSEUR : SINCERITY :: (A) brat : insolence
(B) flirt : decency (C) grouch : patience
(D) recluse : gregariousness (E) rogue : empathy

16. MORALISTIC : PRINCIPLED ::
(A) simplistic : unsophisticated
(B) pedantic : learned
(C) positivistic : empirical
(D) dogmatic : prejudiced
(E) fantastic : imaginative

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Historically, a cornerstone of classical empiricism has been the notion that every true generalization must be confirmable by specific observations. In classical empiricism, the truth of "All balls are red," for example, is assessed by inspecting balls; any observation of a *non*red ball refutes unequivocally the proposed generalization.

For W.V.O. Quine, however, this constitutes an overly "narrow" conception of empiricism. "All balls are red," he maintains, forms one strand within an entire web of statements (our knowledge); individual observations can be referred only to this web as a whole. As new observations are collected, he explains, they must be integrated into the web. Problems occur only if a contradiction develops between a new observation, say, "That ball is blue," and the preexisting statements. In that case, he argues, *any* statement or combination of statements (not merely the "offending" generalization, as in classical empiricism) can be altered to achieve the fundamental requirement, a system free of contradictions, even if, in some cases, the alteration consists of labeling the new observation a "hallucination."

17. The author of the passage is primarily concerned with presenting
    (A) criticisms of Quine's views on the proper conceptualization of empiricism
    (B) evidence to support Quine's claims about the problems inherent in classical empiricism
    (C) an account of Quine's counterproposal to one of the traditional assumptions of classical empiricism
    (D) an overview of classical empiricism and its contributions to Quine's alternate understanding of empiricism
    (E) a history of classical empiricism and Quine's reservations about it

18. According to Quine's conception of empiricism, if a new observation were to contradict some statement already within our system of knowledge, which of the following would be true?
    (A) The new observation would be rejected as untrue.
    (B) Both the observation and the statement in our system that it contradicted would be discarded.
    (C) New observations would be added to our web of statements in order to expand our system of knowledge.
    (D) The observation or some part of our web of statements would need to be adjusted to resolve the contradiction.
    (E) An entirely new field of knowledge would be created.

19. As described in the passage, Quine's specific argument against classical empiricism would be most strengthened if he did which of the following?
    (A) Provided evidence that many observations are actually hallucinations.
    (B) Explained why new observations often invalidate preexisting generalizations.
    (C) Challenged the mechanism by which specific generalizations are derived from collections of particular observations.
    (D) Mentioned other critics of classical empiricism and the substance of their approaches.
    (E) Gave an example of a specific generalization that has not been invalidated despite a contrary observation.

20. It can be inferred from the passage that Quine considers classical empircism to be "overly 'narrow' " (lines 7-8) for which of the following reasons?
    I. Classical empiricism requires that our system of generalizations be free of contradictions.
    II. Classical empiricism demands that in the case of a contradiction between an individual observation and a generalization, the generalization must be abandoned.
    III. Classical empiricism asserts that every observation will either confirm an existing generalization or initiate a new generalization.
    (A) II only
    (B) I and II only
    (C) I and III only
    (D) II and III only
    (E) I, II, and III

GO ON TO THE NEXT PAGE.

Until recently astronomers have been puzzled by the fate of red giant and supergiant stars. When the core of a giant star whose mass surpasses 1.4 times the present mass of our Sun ($M_\odot$) exhausts its nuclear fuel, it is unable to support its own weight and collapses into a tiny neutron star. The gravitational energy released during this implosion of the core blows off the remainder of the star in a gigantic explosion, or a supernova. Since around 50 percent of all stars are believed to begin their lives with masses greater than 1.4 $M_\odot$, we might expect that one out of every two stars would die as a supernova. But in fact, only one star in thirty dies such a violent death. The rest expire much more peacefully as planetary nebulas. Apparently most massive stars manage to lose sufficient material that their masses drop below the critical value of 1.4 $M_\odot$ before they exhaust their nuclear fuel.

Evidence supporting this view comes from observations of IRC + 10216, a pulsating giant star located 700 light-years away from Earth. A huge rate of mass loss (1 $M_\odot$ every 10,000 years) has been deduced from infrared observations of ammonia (NH_3) molecules located in the circumstellar cloud around IRC + 10216. Recent microwave observations of carbon monoxide (CO) molecules indicate a similar rate of mass loss and demonstrate that the escaping material extends outward from the star for a distance of at least one light-year. Because we know the size of the cloud around IRC + 10216 and can use our observations of either NH_3 or CO to measure the outflow velocity, we can calculate an age for the circumstellar cloud. IRC + 10216 has apparently expelled, in the form of molecules and dust grains, a mass equal to that of our entire Sun within the past ten thousand years. This implies that some stars can shed huge amounts of matter very quickly and thus may never expire as supernovas. Theoretical models as well as statistics on supernovas and planetary nebulas suggest that stars that begin their lives with masses around 6 $M_\odot$ shed sufficient material to drop below the critical value of 1.4 $M_\odot$. IRC + 10216, for example, should do this in a mere 50,000 years from its birth, only an instant in the life of a star.

But what place does IRC + 10216 have in stellar evolution? Astronomers suggest that stars like IRC + 10216 are actually "protoplanetary nebulas"—old giant stars whose dense cores have almost but not quite rid themselves of the fluffy envelopes of gas around them. Once the star has lost the entire envelope, its exposed core becomes the central star of the planetary nebula and heats and ionizes the last vestiges of the envelope as it flows away into space. This configuration is a full-fledged planetary nebula, long familiar to optical astronomers.

21. The primary purpose of the passage is to
    (A) offer a method of calculating the age of circumstellar clouds
    (B) describe the conditions that result in a star's expiring as a supernova
    (C) discuss new evidence concerning the composition of planetary nebulas
    (D) explain why fewer stars than predicted expire as supernovas
    (E) survey conflicting theories concerning the composition of circumstellar clouds

22. The passage implies that at the beginning of the life of IRC + 10216, its mass was approximately
    (A) 7.0 $M_\odot$ (B) 6.0 $M_\odot$ (C) 5.0 $M_\odot$ (D) 1.4 $M_\odot$ (E) 1.0 $M_\odot$

23. The view to which line 18 refers serves to
    (A) reconcile seemingly contradictory facts
    (B) undermine a previously held theory
    (C) take into account data previously held to be insignificant
    (D) resolve a controversy
    (E) question new methods of gathering data

24. It can be inferred from the passage that the author assumes which of the following in the discussion of the rate at which IRC + 10216 loses mass?
    (A) The circumstellar cloud surrounding IRC + 10216 consists only of CO and NH_3 molecules.
    (B) The circumstellar cloud surrounding IRC + 10216 consists of material expelled from that star.
    (C) The age of a star is equal to that of its circumstellar cloud.
    (D) The rate at which IRC + 10216 loses mass varies significantly from year to year.
    (E) Stars with a mass greater than 6 $M_\odot$ lose mass at a rate faster than stars with a mass less than 6 $M_\odot$ do.

GO ON TO THE NEXT PAGE.

25. According to information provided by the passage, which of the following stars would astronomers most likely describe as a planetary nebula?

(A) A star that began its life with a mass of 5.5 $M_{\odot}$, has exhausted its nuclear fuel, and has a core that is visible to astronomers

(B) A star that began its life with a mass of 6 $M_{\odot}$, lost mass at a rate of 1 $M_{\odot}$ per 10,000 years, and exhausted its nuclear fuel in 40,000 years

(C) A star that has exhausted its nuclear fuel, has a mass of 1.2 $M_{\odot}$, and is surrounded by a circumstellar cloud that obscures its core from view

(D) A star that began its life with a mass greater than 6 $M_{\odot}$, has just recently exhausted its nuclear fuel, and is in the process of releasing massive amounts of gravitational energy

(E) A star that began its life with a mass of 5.5 $M_{\odot}$, has yet to exhaust its nuclear fuel, and exhibits a rate of mass loss similar to that of IRC + 10216

26. Which of the following statements would be most likely to follow the last sentence of the passage?

(A) Supernovas are not necessarily the most spectacular events that astronomers have occasion to observe.

(B) Apparently, stars that have a mass of greater than 6 $M_{\odot}$ are somewhat rare.

(C) Recent studies of CO and NH_3 in the circumstellar clouds of stars similar to IRC + 10216 have led astronomers to believe that the formation of planetary nebulas precedes the development of supernovas.

(D) It appears, then, that IRC + 10216 actually represents an intermediate step in the evolution of a giant star into a planetary nebula.

(E) Astronomers have yet to develop a consistently accurate method for measuring the rate at which a star exhausts its nuclear fuel.

27. Which of the following titles best summarizes the content of the passage?

(A) New Methods of Calculating the Age of Circumstellar Clouds

(B) New Evidence Concerning the Composition of Planetary Nebulas

(C) Protoplanetary Nebula: A Rarely Observed Phenomenon

(D) Planetary Nebulas: An Enigma to Astronomers

(E) The Diminution of a Star's Mass: A Crucial Factor in Stellar Evolution

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. SEND: (A) drop (B) lift (C) attempt (D) receive (E) locate

29. INTERLOCKING: (A) independent (B) internal (C) peripheral (D) sequential (E) variable

30. REFLECT: (A) diffuse (B) polarize (C) absorb (D) focus (E) propagate

31. LACKLUSTER: (A) necessary (B) descriptive (C) radiant (D) organized (E) mature

32. ZENITH: (A) shortest line (B) furthest edge (C) lowest point (D) roughest curve (E) smallest surface

33. ENGENDER: (A) enumerate (B) emulate (C) exculpate (D) eradicate (E) encapsulate

34. ANOMALOUS:
(A) veracious
(B) precise
(C) essential
(D) conforming to an established rule
(E) proceeding in a timely fashion

35. GRIEVOUS: (A) slight (B) stereotyped (C) solicitous (D) sophisticated (E) sparkling

36. PRECIPITATE: (A) desperate (B) determined (C) dissident (D) deliberate (E) divided

37. PROLIXITY: (A) intense devotion (B) vehement protest (C) serious offense (D) exact measurement (E) extreme brevity

38. DISABUSE: (A) afflict with pain (B) lead into error (C) force into exile (D) remove from grace (E) free from obligation

SECTION 5

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

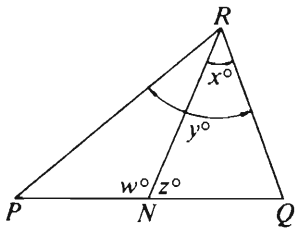
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

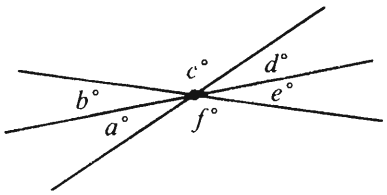


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

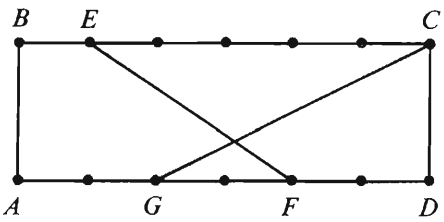
GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	6% of 9	8% of 7



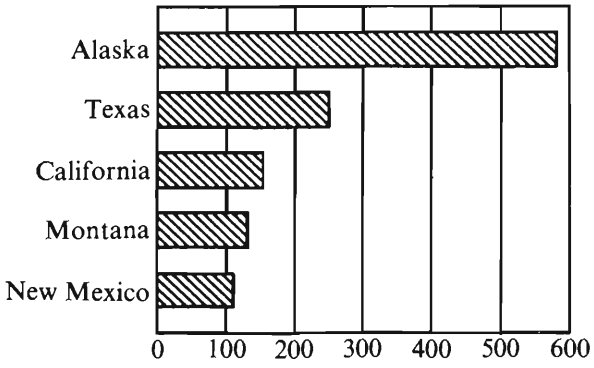
2.	$a + c + e$	$b + d + f$
3.	$\frac{2^3 \cdot 17 \cdot 5^2}{60}$	$\frac{255}{2}$



In rectangle $ABCD$, sides AD and BC have been divided into segments of equal length as shown.

4.	The length of EF	The length of GC

AREAS OF THE FIVE LARGEST STATES



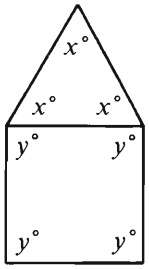
Note: Drawn to scale.

5.	Sum of the areas of Texas, California, Montana, and New Mexico	Area of Alaska

	Column A	Column B
	$x + 5 = 21$ $y - x = -8$	
6.	y	6
7.	0.125	$\frac{1}{8}$

The price of a pen is $(10x + y)$ cents, the price of a notebook is $(10y + x)$ cents, and the sum of the two prices is \$1.43.

8.	x	y

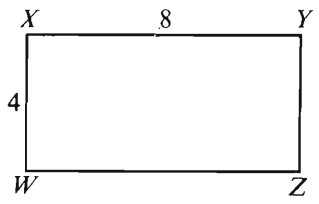


9.	$x + y$	120
10.	$\frac{1}{4 + \frac{1}{3 + \frac{1}{2}}}$	$\frac{1}{2 + \frac{1}{3 + \frac{1}{4}}}$

GO ON TO THE NEXT PAGE.

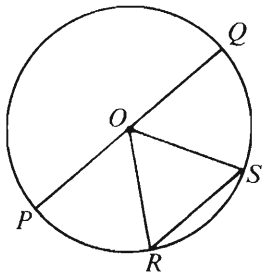
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	x and y are positive integers. $x > 1$ $y < 2$	
11.	x	$2y$
	$\dfrac{\frac{1}{r}}{\frac{1}{t}} = \dfrac{3}{5}$	
12.	$\dfrac{r}{t}$	$\dfrac{t}{r}$



13.	The area of a square region with a perimeter equal to the perimeter of rectangular region $WXYZ$	36

	Column A	Column B
	Among the 900 spectators at a football game, there was a total of x students from College C and a total of y students who were not from College C.	
14.	The number of spectators at the game who were not students	$900 - x - y$



O is the center of the circle, and $\angle ROS$ is a right angle.

15.	$\dfrac{PQ}{RS}$	$\dfrac{2}{1}$

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. If $\frac{x}{2} + 1 = 15$, then $x =$

(A) 5
(B) 7
(C) 13
(D) 28
(E) 29

17. If 15 pies cost a total of \$11.50, then at this rate, what is the cost of 9 pies?

(A) \$6.75
(B) \$6.90
(C) \$7.50
(D) \$8.50
(E) \$9.45

18. If $2(x + y) = 5$, then, in terms of x, $y =$

(A) $\frac{5}{2} - x$

(B) $\frac{5}{2} + x$

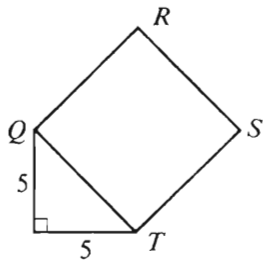
(C) $5 - 2x$

(D) $5 - \frac{x}{2}$

(E) $\frac{5}{2} + \frac{x}{2}$

19. If the average (arithmetic mean) of 16, 20, and n is between 18 and 21, inclusive, what is the greatest possible value of n?

(A) 18
(B) 21
(C) 27
(D) 54
(E) 63



20. In the figure above, what is the area of square $QRST$?

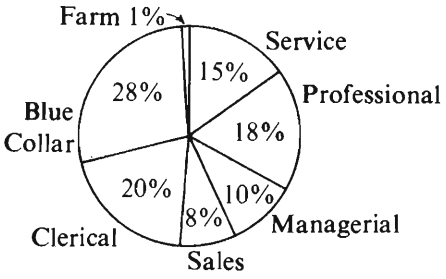
(A) 25
(B) $20\sqrt{2}$
(C) $25\sqrt{2}$
(D) 50
(E) $50\sqrt{2}$

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graphs.

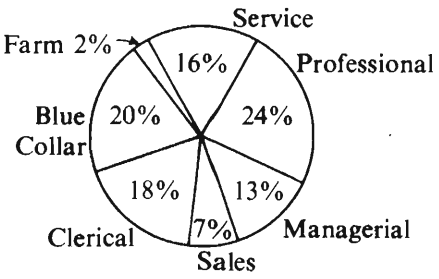
DISTRIBUTION OF WORK FORCE BY OCCUPATIONAL CATEGORY FOR COUNTRY *X* IN 1981 AND PROJECTED FOR 1995

Total Work Force: 150 Million



1981

Total Work Force: 175 Million



1995 (Projected)

21. In 1981, there were how many million Service workers in the work force?

(A) 15.0
(B) 20.5
(C) 22.5
(D) 28.0
(E) 175.0

22. In 1981, how many categories each comprised more than 25 million workers?

(A) One
(B) Two
(C) Three
(D) Four
(E) Five

23. What is the ratio of the number of workers in the Professional category in 1981 to the projected number of such workers in 1995 ?

(A) $\frac{4}{9}$

(B) $\frac{5}{14}$

(C) $\frac{9}{14}$

(D) $\frac{3}{4}$

(E) $\frac{14}{9}$

24. From 1981 to 1995, there is a projected increase in the number of workers in which of the following categories?

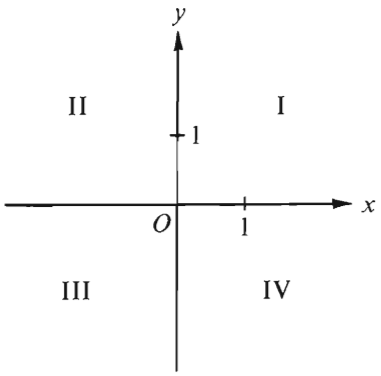
I. Sales
II. Service
III. Clerical

(A) None
(B) III only
(C) I and II only
(D) II and III only
(E) I, II, and III

25. Approximately what is the projected percent decrease in the number of Blue-Collar workers in the work force of Country *X* from 1981 to 1995 ?

(A) 42%
(B) 35%
(C) 20%
(D) 17%
(E) 7%

GO ON TO THE NEXT PAGE.

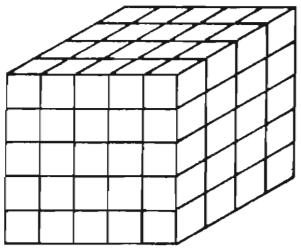


26. Points $(x, -3)$ and $(-2, y)$, not shown in the figure above, are in quadrants IV and II, respectively. If $xy \neq 0$, in which quadrant is point (x, y)?

(A) I
(B) II
(C) III
(D) IV
(E) It cannot be determined from the information given.

27. $(\sqrt{3} - \sqrt{2})^2 =$

(A) $1 - 2\sqrt{6}$
(B) $1 - \sqrt{6}$
(C) $5 - 2\sqrt{6}$
(D) $5 - 2\sqrt{3}$
(E) 1



28. If the figure above is a rectangular solid composed of cubes, each with edge of length 4 centimeters, what is the volume of the rectangular solid in cubic centimeters?

(A) 100
(B) 256
(C) 400
(D) 5,120
(E) 6,400

29. If $L = (a - b) - c$ and $R = a - (b - c)$, then $L - R =$

(A) $2b$
(B) $2c$
(C) 0
(D) $-2b$
(E) $-2c$

30. At the rate of 3,000 revolutions per minute, how many revolutions will a wheel make in k seconds?

(A) $3{,}000k$
(B) $50k$
(C) $\frac{50}{k}$
(D) $\frac{3{,}000}{k}$
(E) $\frac{180{,}000}{k}$

SECTION 6
Time—30 minutes
25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-5

In order to gain full course credit for her tour of a foreign city, Sue must visit exactly seven famous points of interest—a factory, a garden, the harbor, a library, a museum, a palace, and a theater. Any tour plan that Sue devises will allow her to keep to her timetable and is thus acceptable, except that she must plan her tour to conform with the following conditions:

The factory must be one of the first three points visited.
The harbor must be visited immediately before the garden.
The library can be neither the first nor the last point visited.
The museum must be either the first or the last point visited.
The palace must be one of the last three points visited.

1. Which of the following is an acceptable order in which Sue may tour all seven points of interest?

(A) Factory, theater, harbor, library, palace, garden, and museum
(B) Harbor, garden, factory, library, theater, palace, and museum
(C) Library, theater, factory, harbor, garden, museum, and palace
(D) Museum, factory, palace, harbor, library, garden, and theater
(E) Museum, library, harbor, garden, factory, palace, and theater

2. If, on her tour, Sue visits the theater, the library, and the factory, one directly after the other in the order given, she must visit the garden

(A) second
(B) third
(C) fourth
(D) fifth
(E) sixth

3. If Sue begins her tour at the harbor, which of the following could be the fourth point of interest she visits on the tour?

(A) The factory
(B) The garden
(C) The library
(D) The museum
(E) The palace

4. If Sue is to visit the palace sixth, she could visit the harbor in any of the following positions on her tour EXCEPT

(A) first
(B) second
(C) third
(D) fourth
(E) fifth

5. If Sue visits exactly one point of interest between her visits to the factory and the palace, that point must be either the

(A) garden or the harbor
(B) garden or the theater
(C) harbor or the museum
(D) library or the museum
(E) library or the theater

GO ON TO THE NEXT PAGE.

6. Miko: Academic products developed at a university are properly considered the results of "work for hire" and really belong to the institution. Therefore, the university should own the copyright for any computer software developed by its faculty.

Kofi: But a copyright policy this restrictive can impede a university's primary mission of generating and disseminating knowledge.

Kofi's response has which of the following relationships to Miko's argument?

(A) Kofi contradicts Miko's evidence.
(B) Kofi points out a hidden assumption required by Miko's argument.
(C) Kofi points out a problematic consequence of accepting Miko's argument.
(D) Kofi shows that Miko's reasoning is circular.
(E) Kofi shows that Miko forms a generalization from an atypical case.

7. Within the last fifty years, the majority of the United States work force has moved from the manufacturing to the service sector of the economy. This shift has occurred, not because of a decline in the production of goods, but because, with applications of new technology, more production of goods can now be achieved with relatively fewer people, and more people are therefore available to satisfy the increased demand for services.

Which of the following, if true, provides evidence to support the claim made above that more production of goods can now be achieved with relatively fewer people?

(A) Many manufacturing industries in the United States have lost a significant share of their domestic and foreign markets to foreign producers.
(B) Services accounted for half of all jobs in the late 1940's but today account for seventy percent of all jobs.
(C) Manufacturing output was one-third higher in 1980 than in 1970, while manufacturing employment grew only five percent during that period.
(D) Manufacturing industries, on average, pay a higher per-hour wage and use fewer part-time employees than do service industries.
(E) Living standards in states that have shifted to manufacturing economies within the last fifty years are closer to the national average now than in 1940.

8. John: I have tried several different types of psychotherapy at various times in my life: three kinds of "talk" therapy (Freudian, Rogerian, and cognitive) and also behavior therapy. Since the periods when I was in therapy were the least happy times of my life, I have concluded that psychotherapy cannot work for me.

Which of the following statements, if true, would most weaken John's conclusion?

(A) Behavior therapy is designed to address different problems from those addressed by "talk" therapies.
(B) The techniques used in behavior therapy are quite different from those used in "talk" therapies.
(C) People who try several different types of psychotherapy tend to be happier than people who try only one type of psychotherapy.
(D) People who try several different types of psychotherapy are more likely to find one that works for them than are people who try only one type of psychotherapy.
(E) People undergoing psychotherapy that ultimately works are often unhappy while they are in therapy.

GO ON TO THE NEXT PAGE.

Questions 9-14

An elementary school librarian is assigning after-school library duty to parent volunteers for each school day, Monday through Friday, during a single week. Exactly five volunteers—J, K, L, M, and N—are available. The librarian must assign exactly two volunteers to work each day of that week according to the following conditions:

Each of the volunteers must work at least once.
None of the volunteers can work on three consecutive days.
K must work on Monday.
M must work on Thursday and on Friday.
J cannot work on any day on which K works.

9. Any of the following volunteers could be assigned to work on Wednesday EXCEPT

(A) J
(B) K
(C) L
(D) M
(E) N

10. If J is assigned to work on exactly three days of the week, those days must include

(A) Monday and Wednesday
(B) Tuesday and Wednesday
(C) Tuesday and Friday
(D) Wednesday and Friday
(E) Thursday and Friday

11. If K is assigned to work on exactly four days of the week, which of the following could be the pair of volunteers assigned to work on Wednesday?

(A) J and L
(B) J and M
(C) K and L
(D) K and N
(E) M and N

12. If J is assigned to work whenever and only when M is assigned to work, which of the following could be true?

(A) J is assigned to work on Monday.
(B) J is assigned to work on Wednesday.
(C) K is assigned to work on Friday.
(D) L is assigned to work on Friday.
(E) N is assigned to work on Tuesday.

13. If K is assigned to work on only one day and L is assigned to work on exactly four days, which of the following pairs of volunteers must be assigned to work on Wednesday?

(A) J and L
(B) J and N
(C) K and L
(D) L and M
(E) L and N

14. If each volunteer is assigned to work exactly twice, which of the following must be true?

(A) Either J or K is assigned to work on at least one of the days on which M is assigned to work.
(B) K is assigned to work on both of the days on which L is assigned to work.
(C) L is assigned to work on Tuesday.
(D) L is assigned to work on one of the days on which K is assigned to work and on one of the days on which J is assigned to work.
(E) N is assigned to work on two consecutive days.

GO ON TO THE NEXT PAGE.

Questions 15-19

The editors of a journal that publishes three issues a year will devote the upcoming winter, spring, and fall issues—in that order—exclusively to articles written by seven authors: J, K, L, M, N, O, and P. Each of the seven authors will have at least one article published, but some may have more than one article published. The following restrictions apply to the publication of their articles:

If an article by J appears in an issue, then an article by K must also appear in that issue.
If an article by M appears in an issue, then an article by O must appear in the immediately preceding issue.
An article by O cannot be published in an issue that contains an article by P.
No author may publish in each of two consecutively published issues or twice in the same issue.
Each of the issues being prepared must contain at least two articles.
The seven authors' articles can only appear in the upcoming winter, spring, and fall issues.

15. The winter issue of the journal can consist exclusively of articles by which of the following groups of authors?

(A) J and L
(B) M and O
(C) J, O, and P
(D) L, N, and O
(E) J, K, N, O, and P

16. If the winter issue consists exclusively of articles by J and K, then the spring issue can consist exclusively of articles by which of the following groups of authors?

(A) L and N
(B) L and O
(C) M and P
(D) J, K, and P
(E) L, O, and P

17. Which of the following authors CANNOT contribute to the winter issue of the journal?

(A) L
(B) M
(C) N
(D) O
(E) P

18. If the winter issue consists exclusively of articles by K, L, and P, then the fall issue must contain an article by which of the following authors?

(A) K
(B) L
(C) N
(D) O
(E) P

19. If the fall issue consists exclusively of articles by K, L, and M, then the spring issue must have consisted of articles by which of the following groups of authors?

(A) J and N
(B) J and P
(C) K and O
(D) N and O
(E) N and P

GO ON TO THE NEXT PAGE.

Questions 20-22

A pastry chef who is visiting a culinary school wishes to schedule three classes on pastry making—one at 10 a.m., one at 2 p.m., and one at 6 p.m. Eight student chefs—Q, R, S, T, W, X, Y, and Z—who have registered to attend class will each be assigned to one of the three classes. Each class will contain either two or three student chefs. The assignment of student chefs to each class must conform to the following restrictions:

Q must be assigned to a class to which only one other student is assigned.
R must be assigned to the same class as Y.
S must not be assigned to the same class as X.
T must be assigned to either the 10 a.m. class or the 6 p.m. class.
X must be assigned to a class that meets earlier in the day than the class to which W is assigned.

20. Which of the following is a possible assignment of students to the classes?

	10 a.m.	2 p.m.	6 p.m.
(A)	Q, X	R, T, Z	S, W, Y
(B)	Q, W	R, X, Y	S, T, Z
(C)	R, X, Y	S, W, Z	Q, T
(D)	R, X, Y	Q, S, W	T, Z
(E)	S, T, X	R, Y, Z	Q, W

21. If S and Q are assigned to the 6 p.m. class, which of the following must be the group of students assigned to the 10 a.m. class?

(A) R, T, Y
(B) R, X, Y
(C) R, Y, Z
(D) T, W, Z
(E) T, X, Z

22. If Q and Z are assigned to the 10 a.m. class, which of the following must be the group of students assigned to the 6 p.m. class?

(A) R, T, Y
(B) R, W, Y
(C) S, T, W
(D) S, T, X
(E) T, X, Z

23. Board member: As a longtime member of the college's board of trustees, I believe that the board has functioned well in the past because each of its members has had a broad range of experience and interests. Thus, if in the future any members are elected primarily to press for a particular policy, such as reducing tuition, the board will function less well.

In drawing the conclusion above, the board member must have been making which of the following assumptions?

(A) The college will suffer financially if the board reduces tuition.
(B) The college will not be able to operate if and when the board functions less well than it does currently.
(C) The board functions well because its members are primarily interested in particular academic policies rather than in financial policies such as the level of tuition.
(D) In order to be elected as a member of the board, one must have a broad range of experience and interests.
(E) Each of the people who would be elected to the board primarily to press for a particular policy lacks a broad range of experience or interests.

GO ON TO THE NEXT PAGE.

24. When school administrators translate educational research into a standardized teaching program and mandate its use by teachers, students learn less and learn less well than they did before, even though the teachers are the same. The translation by the administrators of theory into prescribed practice must therefore be flawed.

The argument above is based on which of the following assumptions?

(A) Teachers differ in their ability to teach in accordance with standardized programs.
(B) The educational research on which the standardized teaching programs are based is sound.
(C) Researchers should be the ones to translate their own research into teaching programs.
(D) The ways in which teachers choose to implement the programs are ineffective.
(E) The level of student learning will vary from state to state.

25. Figures issued by the government of a certain country show that in 1980 the public sector and the private sector each employed the same number of people. Between 1980 and 1984, according to the government, total employment decreased in the public sector more than it increased in the private sector.

If, according to governmental figures, the unemployment rate in this country was the same in both 1980 and 1984, which of the following statements must be true about this country?

(A) Fewer people were in the labor force, as counted by the government, in 1984 than in 1980.
(B) The competition for the available work increased between 1980 and 1984.
(C) The government's figures for total employment increased between 1980 and 1984.
(D) The number of people counted by the government as unemployed was the same in 1980 and 1984.
(E) In 1984 more people sought work in the private sector than in the public sector.

FOR GENERAL TEST 9 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 2			Section 4		
Number	Answer	P+	Number	Answer	P+
1	A	85	1	A	95
2	D	71	2	A	79
3	B	74	3	C	79
4	E	59	4	B	64
5	E	51	5	C	45
6	E	40	6	E	58
7	B	37	7	A	50
8	E	83	8	A	90
9	B	87	9	E	88
10	B	54	10	C	83
11	E	58	11	A	59
12	B	42	12	B	54
13	D	35	13	E	57
14	D	44	14	C	48
15	D	28	15	D	36
16	E	11	16	B	31
17	C	64	17	C	63
18	A	84	18	D	61
19	D	79	19	E	45
20	E	90	20	A	14
21	A	74	21	D	61
22	D	38	22	B	65
23	B	53	23	A	40
24	E	47	24	B	49
25	A	57	25	A	22
26	A	49	26	D	61
27	B	67	27	E	47
28	A	77	28	D	94
29	C	78	29	A	88
30	A	79	30	C	76
31	B	73	31	C	79
32	D	56	32	C	75
33	E	38	33	D	51
34	C	33	34	D	44
35	D	35	35	A	32
36	E	34	36	D	26
37	A	22	37	E	33
38	A	29	38	B	15

QUANTITATIVE ABILITY					
Section 3			Section 5		
Number	Answer	P+	Number	Answer	P+
1	C	88	1	B	81
2	B	83	2	C	85
3	B	81	3	B	81
4	A	84	4	B	81
5	A	87	5	A	89
6	A	71	6	A	87
7	B	74	7	C	87
8	A	76	8	D	68
9	A	77	9	A	72
10	D	59	10	B	65
11	D	52	11	D	67
12	C	44	12	A	63
13	D	50	13	C	50
14	C	33	14	C	49
15	D	29	15	B	30
16	C	88	16	D	85
17	A	78	17	B	77
18	A	64	18	A	74
19	E	64	19	C	71
20	C	64	20	D	57
21	D	87	21	C	79
22	A	83	22	C	75
23	C	63	23	C	40
24	B	59	24	E	42
25	D	38	25	D	35
26	E	52	26	A	53
27	B	48	27	C	39
28	D	43	28	E	52
29	E	33	29	E	32
30	E	28	30	B	49

ANALYTICAL ABILITY					
Section 1			Section 6		
Number	Answer	P+	Number	Answer	P+
1	C	76	1	B	81
2	B	78	2	D	74
3	D	60	3	C	86
4	C	51	4	E	69
5	D	55	5	E	78
6	A	28	6	C	87
7	D	93	7	C	65
8	D	62	8	E	77
9	A	45	9	D	79
10	A	91	10	C	47
11	E	65	11	A	68
12	E	29	12	E	66
13	D	28	13	B	64
14	D	54	14	A	37
15	C	64	15	D	62
16	B	44	16	B	39
17	E	19	17	B	48
18	A	62	18	A	13
19	B	56	19	D	51
20	D	49	20	C	61
21	B	56	21	E	35
22	E	31	22	C	51
23	E	50	23	E	44
24	D	40	24	B	33
25	E	42	25	A	31

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 9 ONLY AND THE PERCENTS BELOW*

Raw Score	Verbal Scaled Score	Verbal % Below	Quantitative Scaled Score	Quantitative % Below	Analytical Scaled Score	Analytical % Below
72-76	800	99				
71	780	99				
70	770	99				
69	750	98				
68	740	98				
67	730	97				
66	720	96				
65	710	95				
64	690	94				
63	680	93				
62	670	91				
61	660	90				
60	650	88	800	96		
59	640	87	800	96		
58	630	85	800	96		
57	620	83	790	95		
56	610	82	780	93		
55	600	80	770	92		
54	590	78	750	88		
53	580	75	740	87		
52	570	73	730	85		
51	560	71	710	81		
50	550	69	700	79	800	99
49	540	66	690	77	800	99
48	530	63	680	75	800	99
47	520	60	660	71	800	99
46	510	58	650	69	800	99
45	500	55	640	67	780	97
44	490	52	630	65	770	97
43	480	50	620	62	760	96
42	470	47	600	58	750	95
41	460	43	590	56	730	93
40	460	43	580	53	720	92
39	450	40	570	51	700	89
38	440	37	560	49	690	87
37	430	34	550	46	670	84
36	420	31	540	44	660	81
35	410	28	530	41	640	78
34	400	25	520	39	630	75
33	400	25	510	37	610	70
32	390	23	500	34	600	67
31	380	20	490	32	590	65
30	370	18	470	28	570	59
29	360	15	460	25	560	56
28	360	15	450	23	540	50
27	350	13	440	21	530	47
26	340	11	430	19	510	42
25	340	11	410	16	500	38
24	330	9	400	14	480	33
23	320	8	390	12	470	30
22	310	7	380	11	450	26
21	300	5	370	10	440	23
20	290	4	360	8	420	19
19	280	3	340	6	410	17
18	270	2	330	5	390	14
17	260	2	320	4	380	12
16	250	1	310	3	360	9
15	250	1	290	2	350	8
14	240	1	280	2	330	6
13	230	1	260	1	320	5
12	220	1	250	1	300	3
11	210	1	230	1	280	2
10	200	1	210	1	260	1
9	200	1	200	1	250	1
8	200	1	200	1	230	1
7	200	1	200	1	210	1
0-6	200	1	200	1	200	1

*Percent scoring below the scaled score is based on the performance of 954,995 examinees who took the General Test between October 1, 1987, and September 30, 1990. This percent below information is used for score reports during the 1991-92 testing year.

TEST 10

SECTION 1

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. It was a war the queen and her more prudent counselors wished to ------ if they could and were determined in any event to ------ as long as possible.

   (A) provoke. .delay
   (B) denounce. .deny
   (C) instigate. .conceal
   (D) curtail. .promote
   (E) avoid. .postpone

2. Despite many decades of research on the gasification of coal, the data accumulated are not directly ------- to environmental questions; thus a new program of research specifically addressing such questions is -------.

   (A) analogous. .promising
   (B) transferable. .contradictory
   (C) antithetical. .unremarkable
   (D) applicable. .warranted
   (E) pertinent. .unnecessary

3. Unlike other creatures, who are shaped largely by their ------- environment, human beings are products of a culture accumulated over centuries, yet one that is constantly being ------- by massive infusions of new information from everywhere.

   (A) harsh. .unconfirmed
   (B) surrounding. .upheld
   (C) immediate. .transformed
   (D) natural. .mechanized
   (E) limited. .superseded

4. Edith Wharton sought in her memoir to present herself as having achieved a harmonious wholeness by having ------- the conflicting elements of her life.

   (A) affirmed
   (B) highlighted
   (C) reconciled
   (D) confined
   (E) identified

5. In their preface, the collection's editors plead that certain of the important articles they ------- were published too recently for inclusion, but in the case of many such articles, this ------- is not valid.

   (A) discussed. .replacement
   (B) omitted. .excuse
   (C) revised. .clarification
   (D) disparaged. .justification
   (E) ignored. .endorsement

6. The labor union and the company's management, despite their long history of unfailingly acerbic disagreement on nearly every issue, have nevertheless reached an unexpectedly -------, albeit still tentative, agreement on next year's contract.

   (A) swift
   (B) onerous
   (C) hesitant
   (D) reluctant
   (E) conclusive

7. In response to the follies of today's commercial and political worlds, the author does not ------- inflamed indignation, but rather ------- the detachment and smooth aphoristic prose of an eighteenth-century wit.

   (A) display. .rails at
   (B) rely on. .avoids
   (C) suppress. .clings to
   (D) express. .affects
   (E) resort to. .spurns

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. FEAR : COWER ::

(A) calmness : fret
(B) anger : rant
(C) disappointment : console
(D) gladness : satisfy
(E) embarrassment : speak

9. BACTERIA : DECOMPOSITION ::

(A) lava : eruption
(B) penicillin : injection
(C) yeast : fermentation
(D) oxygen : respiration
(E) plants : deforestation

10. PALATE : MOUTH ::

(A) curb : sidewalk
(B) star : sky
(C) stream : dam
(D) mountain : range
(E) ceiling : room

11. SLAKE : THIRST ::

(A) perspire : exertion
(B) moan : voice
(C) shiver : muscle
(D) satiate : hunger
(E) dream : sleep

12. FOIBLE : FAULT ::

(A) perjury : testimony
(B) reputation : disrepute
(C) vagary : notion
(D) feud : hostility
(E) quibble : objection

13. IMPORTUNE : REQUEST ::

(A) pry : inquiry
(B) balk : obstacle
(C) fulminate : silence
(D) discountenance : plea
(E) vitiate : punishment

14. MILL : GRAIN ::

(A) loom : cloth
(B) bazaar : wares
(C) factory : furniture
(D) hospital : medicine
(E) forge : metal

15. DAGUERREOTYPE : PHOTOGRAPH ::

(A) bust : statue
(B) pastiche : painting
(C) narrative : novel
(D) hieroglyphic : papyrus
(E) musket : firearm

16. INDISTINGUISHABLE : CONFOUND ::

(A) exceptional : overlook
(B) impregnable : attack
(C) ostentatious : consume
(D) equivalent : interchange
(E) occluded : reveal

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

The 1960's witnessed two profound social movements: the civil rights movement and the movement protesting the war in Vietnam. Although they overlapped in time, they were largely distinct. For a brief moment in 1967, however, it appeared that the two movements might unite under the leadership of Martin Luther King, Jr.

King's role in the antiwar movement appears to require little explanation, since he was the foremost advocate of nonviolence of his time. But King's stance on the Vietnam War cannot be explained in terms of pacifism alone. After all, he was something of a latecomer to the antiwar movement, even though by 1965 he was convinced that the role of the United States in the war was indefensible. Why then the two years that passed before he translated his private misgivings into public dissent? Perhaps he believed that he could not criticize American foreign policy without endangering the support for civil rights that he had won from the federal government.

17. According to the passage, the delay referred to in lines 12-15 is perhaps attributable to which of the following?

(A) King's ambivalence concerning the role of the United States in the war in Vietnam
(B) King's attempts to consolidate support for his leadership within the civil rights movement
(C) King's desire to keep the leadership of the civil rights movement distinct from that of the antiwar movement
(D) King's desire to draw support for the civil rights movement from the leadership of the antiwar movement
(E) King's reluctance to jeopardize federal support for the civil rights movement

18. The author supports the claim that "King's stance on the Vietnam War cannot be explained in terms of pacifism alone" (lines 10-12) by implying which of the following?

(A) There is little evidence that King was ever a student of pacifist doctrine.
(B) King, despite pacifist sympathies, was not convinced that the policy of the federal government in Vietnam was wrong.
(C) King's belief in nonviolence was formulated in terms of domestic policy rather than in terms of international issues.
(D) Had King's actions been based on pacifism alone, he would have joined the antiwar movement earlier than he actually did.
(E) Opponents of United States foreign policy within the federal government convinced King of their need for support.

19. Which of the following can be inferred from the passage about the movement opposing the war in Vietnam?

(A) It preceded the civil rights movement.
(B) It began in 1965.
(C) It was supported by many who otherwise opposed public dissent.
(D) It drew support from most civil rights leaders.
(E) It was well underway by 1967.

20. Which of the following best describes the passage?

(A) It discusses an apparent inconsistency and suggests a reason for it.
(B) It outlines a sequence of historical events.
(C) It shows why a commonly held view is inaccurate.
(D) It evaluates an explanation and finally accepts that explanation.
(E) It contrasts two views of an issue.

GO ON TO THE NEXT PAGE.

What causes a helix in nature to appear with either a dextral ("right-handed," or clockwise) twist or a sinistral ("left-handed," or counterclockwise) twist is one of the most intriguing puzzles in the science of form. Most spiral-shaped snail species are predominantly dextral. But at one time, handedness (twist direction of the shell) was equally distributed within some snail species that have become predominantly dextral or, in a few species, predominantly sinistral. What mechanisms control handedness and keep left-handedness rare?

It would seem unlikely that evolution should discriminate against sinistral snails if sinistral and dextral snails are exact mirror images, for any disadvantage that a sinistral twist in itself could confer on its possessor is almost inconceivable. But left- and right-handed snails are not actually true mirror images of one another. Their shapes are noticeably different. Sinistral rarity might, then, be a consequence of possible disadvantages conferred by these other concomitant structural features. In addition, perhaps left- and right-handed snails cannot mate with each other, having incompatible twist directions. Presumably an individual of the rarer form would have relative difficulty in finding a mate of the same hand, thus keeping the rare form rare or creating geographically separated right- and left-handed populations.

But this evolutionary mechanism combining dissymmetry, anatomy, and chance does not provide an adequate explanation of why right-handedness should have become predominant. It does not explain, for example, why the infrequent unions between snails of opposing hands produce fewer offspring of the rarer than the commoner form in species where each parent contributes equally to handedness. Nor does it explain why, in a species where one parent determines handedness, a brood is not exclusively right- or left-handed when the offspring would have the same genetic predisposition. In the European pond snail *Lymnaea peregra*, a predominantly dextral species whose handedness is maternally determined, a brood might be expected to be exclusively right- or left-handed—and this often occurs. However, some broods possess a few snails of the opposing hand, and in predominantly sinistral broods, the incidence of dextrality is surprisingly high.

Here, the evolutionary theory must defer to a theory based on an explicit developmental mechanism that can favor either right- or left-handedness. In the case of *Lymnaea peregra*, studies indicate that a dextral gene is expressed during egg formation; i.e., before egg fertilization, the gene produces a protein, found in the cytoplasm of the egg, that controls the pattern of cell division and thus handedness. In experiments, an injection of cytoplasm from dextral eggs changes the pattern of sinistral eggs, but an injection from sinistral eggs does not influence dextral eggs. One explanation for the differing effects is that all *Lymnaea peregra* eggs begin left-handed but most switch to being right-handed. Thus, the path to a solution to the puzzle of handedness in all snails appears to be as twisted as the helix itself.

21. Which of the following would serve as an example of "concomitant structural features" (line 19) that might disadvantage a snail of the rarer form?

(A) A shell and body that are an exact mirror image of a snail of the commoner form
(B) A smaller population of the snails of the rarer form
(C) A chip or fracture in the shell caused by an object falling on it
(D) A pattern on the shell that better camouflages it
(E) A smaller shell opening that restricts mobility and ingestion relative to that of a snail of the commoner form

22. The second paragraph of the passage is primarily concerned with offering possible reasons why

(A) it is unlikely that evolutionary mechanisms could discriminate against sinistral snails
(B) sinistrality is relatively uncommon among snail species
(C) dextral and sinistral populations of a snail species tend to intermingle
(D) a theory based on a developmental mechanism inadequately accounts for the predominance of dextrality across snail species
(E) dextral snails breed more readily than sinistral snails, even within predominantly sinistral populations

23. In describing the "evolutionary mechanism" (line 27), the author mentions which of the following?

(A) The favorable conditions for nurturing new offspring
(B) The variable environmental conditions that affect survival of adult snails
(C) The availability of potential mates for breeding
(D) The structural identity of offspring to parents of the same hand
(E) The frequency of unions between snails of different species

GO ON TO THE NEXT PAGE.

24. According to the passage, which of the following is true of *Lymnaea peregra*?

(A) Handedness within the species was at one time equally distributed between left and right.
(B) Under laboratory conditions, dextral eggs from *Lymnaea peregra* can be artificially induced to develop into sinistral snails.
(C) Broods of *Lymnaea peregra* are, without variation, exclusively sinistral or dextral.
(D) Handedness in *Lymnaea peregra* offspring is determined by only one of the parents.
(E) Geographic factors have played a larger role than has genetics in the evolution of the species.

25. The passage implies that in *Lymnaea peregra*, there will generally be

(A) more offspring of the nondominant hand in broods where handedness is determined after, rather than before, fertilization
(B) a sinistral gene that produces a protein in the cytoplasm of the egg cell
(C) fewer sinistral offspring in dextral broods than dextral offspring in sinistral broods
(D) equal numbers of exclusively left- and right-handed broods
(E) an increasing occurrence of left-handedness in successive broods

26. It can be inferred from the passage that a predominantly sinistral snail species might stay predominantly sinistral for each of the following reasons EXCEPT for

(A) a developmental mechanism that affects the cell-division pattern of snails
(B) structural features that advantage dextral snails of the species
(C) a relatively small number of snails of the same hand for dextral snails of the species to mate with
(D) anatomical incompatibility that prevents mating between snails of opposing hands within the species
(E) geographic separation of sinistral and dextral populations

27. Which of the following accurately describes the relationship between the evolutionary and developmental theories discussed in the passage?

(A) Although the two theories reach the same conclusion, each is based on different assumptions.
(B) They present contradictory explanations of the same phenomenon.
(C) The second theory accounts for certain phenomena that the first cannot explain.
(D) The second theory demonstrates why the first is valid only for very unusual, special cases.
(E) They are identical and interchangeable in that the second theory merely restates the first in less technical terms.

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. IMPERMEABLE: (A) sandy (B) resilient (C) blunt (D) sticky (E) porous

29. SERRATED: (A) dull (B) smooth (C) random (D) fragile (E) tarnished

30. INGRATE: (A) thankful person (B) polite person (C) friendly person (D) witty person (E) well-educated person

31. COALESCED: (A) spread rapidly (B) heated quickly (C) broken apart (D) uncovered (E) soaked

32. EFFRONTERY: (A) skepticism (B) serenity (C) timidity (D) conformity (E) impartiality

33. LACONIC: (A) stylized (B) unedited (C) insincere (D) verbose (E) outgoing

34. HEGEMONY: (A) lack of authority (B) lack of energy (C) lack of precision (D) lack of confidence (E) lack of awareness

35. PIQUE: (A) poke fun at (B) give hope to (C) neglect (D) mollify (E) dissuade

36. SUPPLICATE: (A) misrepresent (B) demand (C) evade (D) vacillate (E) discourage

37. ENERVATE: (A) grant permission (B) provide assistance (C) make restitution (D) irritate (E) fortify

38. VERISIMILAR: (A) implausible (B) digressing (C) monotonous (D) unusual (E) unique

SECTION 2

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-7

Six puppies—K, L, M, S, T, U—must each be scheduled for examination by a veterinarian. The puppies are to be examined one at a time in six consecutive time slots on the same day according to the following conditions:

M cannot be examined immediately before or immediately after S.
L must be examined immediately before U.
K must be examined fourth.

1. Which of the following is an acceptable examination schedule for the puppies, in order from first examined to last examined?

(A) L, T, S, K, M, U
(B) L, U, T, K, S, M
(C) M, T, S, L, U, K
(D) S, T, M, K, L, U
(E) T, M, S, K, L, U

2. If L is examined second, which of the following must be true?

(A) K is examined at some time before S.
(B) M is examined at some time before T.
(C) T is examined at some time after K.
(D) M is examined sixth.
(E) S is examined first.

3. S can be examined in any of the following time slots EXCEPT

(A) first
(B) second
(C) third
(D) fifth
(E) sixth

4. If L is examined first, T must be examined

(A) immediately before K
(B) immediately before S
(C) at some time before M
(D) at some time after K
(E) at some time after S

5. If S is examined sixth, which of the following is a complete and accurate list of the time slots any one of which could be the time slot in which M is examined?

(A) First
(B) First, second
(C) First, third
(D) First, second, third
(E) Second, third, fifth

6. If U is examined at some time before M is examined, L can be examined

(A) immediately after S
(B) immediately after T
(C) immediately before T
(D) at some time after M
(E) at some time after K

7. If both M and T are examined at some time after K is examined, S must be examined

(A) first
(B) second
(C) third
(D) first or else third
(E) second or else third

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8. An oil company conducted an investigation of the environmental effects of oil spills and concluded that waterfowl exposed to oil spills have a 95 percent survival rate. The investigation, based on the examination of waterfowl admitted to a veterinary clinic near the site of a recent oil spill, noted that only one in twenty affected waterfowl died.

   Which of the following, if true, would cast the most serious doubt on the investigation's conclusion about the survival rate of the waterfowl?

   (A) Many of the affected waterfowl that survived the spill had suffered serious injuries.
   (B) Each affected waterfowl that died was larger than average for its species.
   (C) Most of the affected waterfowl were exposed to oil floating on the surface of the water.
   (D) Very few of the affected waterfowl were readmitted to the clinic after reexposure to the oil.
   (E) Only those affected waterfowl that appeared to stand a good chance of survival were brought to the veterinary clinic.

9. A test of the National Weather Service's storm-detecting radar systems found that the 1957 system is ten times more reliable than the new computerized system. Therefore, the technology used in the new radar system must be less sophisticated than the radar technology used in the 1957 system.

   The conclusion drawn above depends on which of the following questionable assumptions?

   (A) The reliability of storm-detecting radar systems is determined by the frequency of breakdowns.
   (B) The level of sophistication of the technology used in storm-detecting radar systems can be determined from the reliability of the system.
   (C) The reliability of storm-detecting radar systems is determined by their accuracy in predicting weather patterns.
   (D) Computer hardware is now a key component of the new storm-detecting radar systems used by weather forecasting services.
   (E) Most of the significant advances in storm-detecting radar systems technology were made in the 1950's.

10. A doctor investigated whether an insufficient amount of dopamine in the brain causes Parkinson's disease. The doctor injected dopamine into the bloodstreams of patients with Parkinson's disease. The progress of the disease was not halted, nor did any of the patients improve. The doctor concluded that Parkinson's disease must be caused by something other than a lack of dopamine in the brain.

    Which of the following, if true, casts the most doubt on the doctor's conclusion?

    (A) Parkinson's disease causes the brain to produce less dopamine than it normally would.
    (B) Recent research has shown that dopamine, when injected into the bloodstream, cannot enter the brain.
    (C) Research has shown that dopamine often causes diseases other than Parkinson's disease.
    (D) Dopamine synthesized in the laboratory for injections is identical at the molecular level to dopamine synthesized in the brain.
    (E) Research has shown that many different chemicals interact to influence the workings of the brain.

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Questions 11-16

A college has decided to appoint a four-member committee to review educational policy. Eight faculty members are eligible to serve on the committee: F, G, J, K, L, N, O, and P. Three of these eight—G, L, and N—are untenured, whereas the remaining five are tenured. College policy and the personalities of the eight people in question dictate that the choice of committee members meet the following conditions:

The committee must be composed of exactly two tenured faculty members and exactly two untenured faculty members.
G and J cannot serve together.
If P is on the committee, then neither N nor O can be on the committee.
If K is on the committee, then J must be on the committee.
If both F and J are on the committee, then L cannot be on the committee.

11. If P is on the committee, the other three members of the committee must be

(A) F, G, and L
(B) F, G, and N
(C) G, J, and L
(D) G, K, and L
(E) J, K, and L

12. If J is on the committee, which of the following is one of the faculty members who must also be on the committee?

(A) F
(B) K
(C) L
(D) O
(E) P

13. If G is on the committee, any of the following could be on the committee EXCEPT

(A) K
(B) L
(C) N
(D) O
(E) P

14. If neither F nor P is on the committee, which of the following could be a list of the committee members?

(A) G, J, L, and O
(B) G, K, N, and O
(C) G, L, O, and N
(D) J, K, L, and O
(E) J, L, N, and O

15. If L is not on the committee, which of the following is a list of people all of whom must be on the committee?

(A) F, G, and N
(B) F, J, and N
(C) G, K, and N
(D) J, K, and N
(E) J, N, and P

16. If L and N do not both serve on the committee, which of the following is a list of people all of whom could be on the committee together?

(A) F, G, and L
(B) F, J, and N
(C) F, N, and P
(D) G, K, and N
(E) K, L, and P

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Questions 17-22

The organizers of a debate tournament will give an awards banquet after the final round of debates for the two teams in that round: for the Grizzlies, composed of Coach F and debaters H, I, and L, and for the Wolverines, composed of Coach T and debaters V, X, and Z. At the winners' table exactly seven places will be set, all along one side of the table and consecutively numbered one through seven. The assignment of occupants to these seven positions will be determined by the team scores from the final round of debates and must meet the following conditions:

All the debaters will be seated.
If one team wins, the coach of the winning team will sit in the first position and a debater from that team will sit in the fourth position.
In case of a tie, neither coach will sit at the winners' table, and Judge R will sit in the fourth position.
No two debaters from the same team can sit next to each other.
H and Z will not sit next to each other.

17. Which of the following could be an acceptable assignment for positions one through four, respectively?

	One	Two	Three	Four
(A)	H	T	L	Z
(B)	F	H	Z	L
(C)	T	H	X	R
(D)	T	Z	I	X
(E)	X	Z	L	R

18. If I and Z sit, respectively, in the second and seventh positions, which of the following must sit in the first position?

(A) F
(B) H
(C) L
(D) T
(E) V

19. If Z and L are, respectively, in the first and seventh positions, which of the following must sit in the fifth position?

(A) H
(B) I
(C) T
(D) V
(E) X

20. If the Grizzlies and the Wolverines tie, which of the following could be an acceptable assignment for positions three through six, respectively?

	Three	Four	Five	Six
(A)	H	R	I	Z
(B)	I	Z	R	H
(C)	X	R	H	Z
(D)	X	R	Z	I
(E)	Z	R	H	X

21. If T and H sit in the first and third positions, respectively, which of the following can sit in the fourth position?

(A) I
(B) L
(C) R
(D) X
(E) Z

22. If H, X, and L sit, respectively, in the third, fifth, and sixth positions, which of the following must sit in the seventh position?

(A) F
(B) I
(C) T
(D) V
(E) Z

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23. Geological and historical evidence shows that earthquakes in the eastern United States can be as powerful as those in California and can strike a much larger area. An eastern earthquake will jolt an area 100 times greater than the area that would be affected by a California quake of comparable magnitude.

Which of the following, if true, most helps to explain the difference described above in the size of the affected areas?

(A) Buildings in the eastern United States are typically older than those in California and will therefore suffer far greater damage in the event of a major earthquake.
(B) The crust of the Earth in California, compared to that in the eastern United States, has a greater abundance of faults that absorb the shock waves of an earthquake as they travel outward from the epicenter.
(C) Several of the most powerful and extensive earthquakes that have occurred in the United States were centered somewhere in the eastern United States.
(D) Since major earthquakes have occurred far less frequently and regularly in the eastern United States than in California, it is harder to predict when the next major eastern quake might strike.
(E) The causes of earthquakes in California are better understood than those of earthquakes in the eastern United States.

24. The major goal of physical education programs in schools is to help all children become physically fit. But only a small proportion of children ever participate in team sports. Moreover, team sports usually do less to encourage fitness in participants than do physical education programs that focus directly on aerobic exercise.

The considerations above, if true, could be used most effectively to argue against

(A) the use of in-school physical education programs to encourage lifelong fitness habits in students
(B) the participation by young children in community sports teams
(C) schools' relying heavily on aerobic exercise programs to help all children become physically fit
(D) the use of a large part of a school's physical education curriculum for team sports
(E) the use of team sports in schools as an occasional activity for talented athletes

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25. United States advertising agencies are increasingly using interviews at shopping malls, called "mall intercepts," to test for advertising effectiveness, product concept viability, and consumer buying habits. Critics of mall intercepts maintain that the shopping habits of mall shoppers are not representative of those of the larger population.

Which of the following, if true, would provide evidence that most supports the critics' claim about mall intercepts?

(A) Some mall shoppers patronize more than one store in any given shopping trip.
(B) Mall shoppers, on average, spend 50 percent more time shopping than shoppers at other locations do.
(C) In the course of any year, 95 percent of all households in the United States have at least one member who does some shopping at a mall.
(D) Mall shoppers who use public transportation to reach the mall tend to have lower incomes than mall shoppers who drive to the mall.
(E) Indoor malls often attract the customary numbers of shoppers even during inclement weather when outdoor malls are likely to lose business.

SECTION 3

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

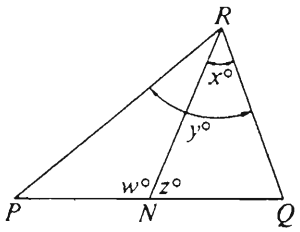
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

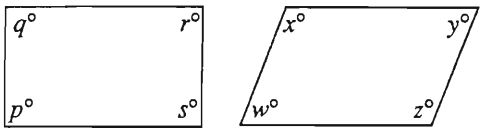
Examples 2-4 refer to $\triangle PQR$.

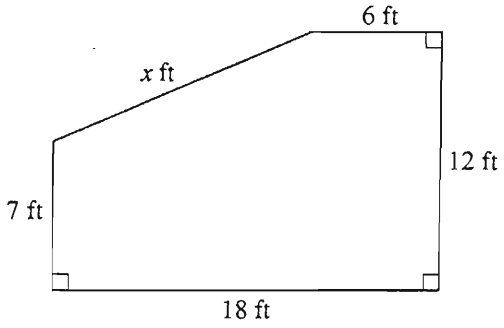


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

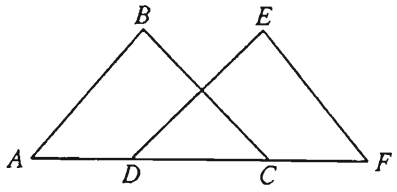
	Column A	Column B
	On map X each centimeter represents 20 kilometers.	
1.	The actual distance, in kilometers, between two locations that are 17 centimeters apart on map X	300
2.	 $p + q + r + s$	$w + x + y + z$
3.	$\frac{54}{75}$	$\frac{4}{7}$
4.	$\frac{\sqrt{3}}{3}$	$\frac{\sqrt{1}}{1}$
	$4r + t = 10$	
5.	r	t

	Column A	Column B
6.	$\frac{7^{10}}{7^5}$	$\frac{7^{11}}{7^6}$
	The ratio of the length of a side of square S to the length of a side of equilateral triangle T is 4 to 5.	
7.	The perimeter of S	The perimeter of T
	$m + \frac{1}{2} = \frac{1}{3}$	
8.	m	$\frac{1}{6}$
9.	$(\sqrt{0.5})^4$	0.5
	 The figure shows the dimensions of a certain plot of land.	
10.	x	12

GO ON TO THE NEXT PAGE.

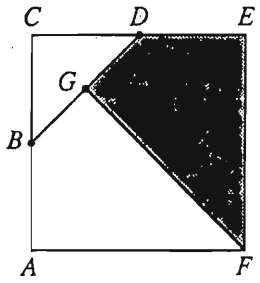
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	$(x - 3)(x + 2) = 0$	
11.	x	2

	Column A	Column B
	 $\triangle ABC$ and $\triangle DEF$ have the same area. $AD > CF$	
12.	The altitude of $\triangle ABC$ from B to AC	The altitude of $\triangle DEF$ from E to DF

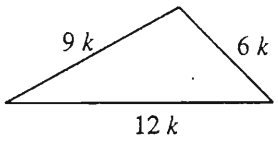
	Column A	Column B
	$x > 1$	
13.	$\frac{x^3}{3}$	$\frac{x^2}{2}$

	Column A	Column B
	Pencils have the same unit cost regardless of the number sold. x pencils cost a total of \$0.50, and n pencils cost a total of y dollars.	
14.	n	$2xy$

	Column A	Column B
	 $ACEF$ is a square region and B, D, and G are midpoints of AC, CE, and BD, respectively.	
15.	The fraction of $ACEF$ that is shaded	$\frac{7}{16}$

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.



16. If the length of the longest side of the triangle shown above is 36, what is the perimeter of the triangle?

(A) 51
(B) 63
(C) 81
(D) 108
(E) 162

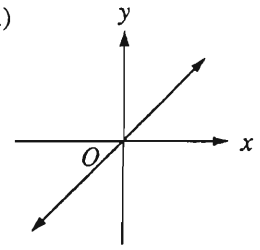
17. If $\frac{5}{8} = \frac{3}{x}$ and $y = \frac{1}{5}$, what is the value of $x + 6y$?

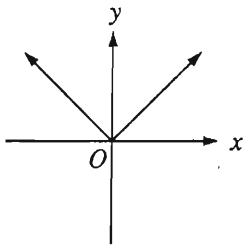
(A) $\frac{41}{30}$
(B) 2
(C) $\frac{16}{5}$
(D) 6
(E) $\frac{203}{15}$

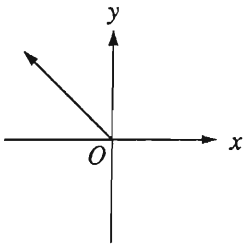
18. The daily rate for a hotel room that sleeps 4 people is \$39 for one person and x dollars for each additional person. If 3 people take the room for one day and each pays \$21 for the room, what is the value of x?

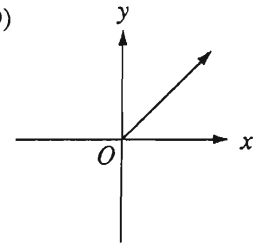
(A) 6
(B) 8
(C) 12
(D) 13
(E) 24

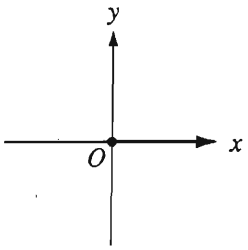
19. Which of the following is the graph of the equation $y = |x|$ for all real values of x? (Note: All graphs drawn to scale.)

(A)


(B)


(C)


(D)


(E)


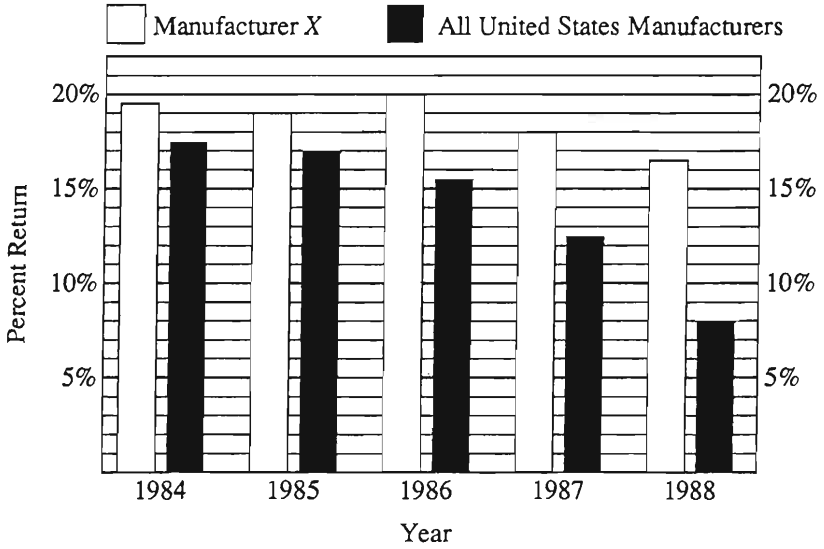
20. The average (arithmetic mean) of a set of 12 numbers, which includes 34, is N. If 34 is removed from the set and 38 is added to the set, what is the average of the new set of numbers, in terms of N?

(A) $N + \frac{1}{3}$
(B) $N + \frac{19}{6}$
(C) $N + 4$
(D) $N + 6$
(E) $12N + 4$

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graph.

PERCENT RETURN ON SHAREHOLDERS' EQUITY
MANUFACTURER *X VERSUS* ALL UNITED STATES MANUFACTURERS



Note: Graph drawn to scale.

21. If shareholders in Manufacturer X had \$100 million in equity in 1987, then the dollar amount of the shareholders' return on this equity was

(A) \$82.0 million
(B) \$18.0 million
(C) \$15.5 million
(D) \$12.5 million
(E) \$1.85 million

22. In 1986 Manufacturer X's return per dollar of shareholders' equity was approximately how much greater than that of all United States manufacturers?

(A) \$0.01
(B) \$0.02
(C) \$0.025
(D) \$0.035
(E) \$0.045

23. The decrease in percent return on shareholders' equity for all United States manufacturers from 1987 to 1988 was approximately how many times the decrease in percent return on shareholders' equity for all United States manufacturers from 1985 to 1986 ?

(A) 9
(B) 6
(C) 4.5
(D) 3
(E) 1.5

24. For the year shown, other than 1987, in which the percent return on shareholders' equity for Manufacturer X was most nearly equal to that for 1987, what was the percent return for all United States manufacturers?

(A) 8%
(B) $12\frac{1}{2}\%$
(C) $15\frac{1}{2}\%$
(D) 17%
(E) $17\frac{1}{2}\%$

25. Which of the following statements can be supported by the data in the graph?

I. The percent return on shareholders' equity for all United States manufacturers decreased from 1984 to 1988 by less than 10 percentage points.
II. A return on shareholders' equity of more than 7 percent was achieved by each United States manufacturer in 1988.
III. The shareholders' equity for Manufacturer X was greater in 1987 than in 1988.

(A) I only
(B) III only
(C) I and II only
(D) II and III only
(E) I, II, and III

GO ON TO THE NEXT PAGE.

26. Which of the following inequalities is true?

(A) $0 < \frac{1}{10} < 0.01$

(B) $0.12 < \frac{1}{8} < 0.13$

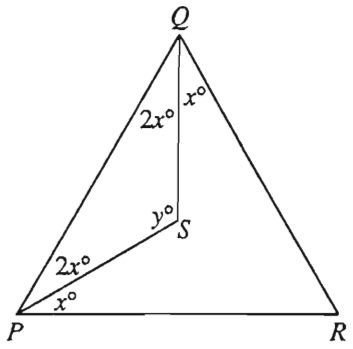
(C) $0.30 < \frac{1}{4} < 0.50$

(D) $0.30 < \frac{1}{3} < 0.33$

(E) $1.35 < \frac{6}{5} < 1.56$

27. If a person can save \$380 in 5 weeks, in how many weeks, at this same rate, can the person save 2.6 times this amount?

(A) 13
(B) 12.5
(C) 11
(D) 10.6
(E) 8



28. In the figure above, if the measure of $\angle R$ is 30°, then $y =$

(A) 60
(B) 80
(C) 100
(D) 120
(E) 140

29. A positive integer with exactly two different divisors greater than 1 must be

(A) a prime
(B) an even integer
(C) a multiple of 3
(D) the square of a prime
(E) the square of an odd integer

30. The expression $\frac{1+\sqrt{2}}{1-\sqrt{2}}$ is equivalent to which of the following?

(A) $1 + \frac{2}{3}\sqrt{2}$

(B) $-1 - \frac{2}{3}\sqrt{2}$

(C) -1

(D) $3 + 2\sqrt{2}$

(E) $-3 - 2\sqrt{2}$

SECTION 4

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Vaillant, who has been particularly interested in the means by which people attain mental health, seems to be looking for ------- answers: a way to close the book on at least a few questions about human nature.

   (A) definitive
   (B) confused
   (C) temporary
   (D) personal
   (E) derivative

2. The well-trained engineer must understand fields as diverse as physics, economics, geology, and sociology; thus, an overly ------- engineering curriculum should be avoided.

   (A) narrow
   (B) innovative
   (C) competitive
   (D) rigorous
   (E) academic

3. Although supernovas are among the most ------- of cosmic events, these stellar explosions are often hard to -------, either because they are enormously far away or because they are dimmed by intervening dust and gas clouds.

   (A) remote. .observe
   (B) luminous. .detect
   (C) predictable. .foresee
   (D) ancient. .determine
   (E) violent. .disregard

4. During the widespread fuel shortage, the price of gasoline was so ------- that suppliers were generally thought to be ------- the consumer.

   (A) reactive. .shielding
   (B) stable. .blackmailing
   (C) depressed. .cheating
   (D) prohibitive. .placating
   (E) excessive. .gouging

5. Art ------- science, but that does not mean that the artist must also be a scientist; an artist uses the fruits of science but need not ------- the theories from which they derive.

   (A) precedes. .anticipate
   (B) incorporates. .understand
   (C) transcends. .abandon
   (D) imitates. .repudiate
   (E) resembles. .contest

6. Imposing steep fines on employers for on-the-job injuries to workers could be an effective ------- to creating a safer workplace, especially in the case of employers with poor safety records.

   (A) antidote
   (B) alternative
   (C) addition
   (D) deterrent
   (E) incentive

7. Literature is inevitably a ------- rather than ------- medium for the simple reason that writers interpose their own vision between the reader and reality.

   (A) distorting. .a neutral
   (B) transparent. .an opaque
   (C) colorful. .a drab
   (D) flawless. .an inexact
   (E) flexible. .a rigid

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. SCRIBBLE : WRITE ::

(A) limp : walk
(B) draw : print
(C) mumble : talk
(D) float : swim
(E) say : sing

9. DETOXIFICATION : POISON ::

(A) surge : current
(B) diet : reduction
(C) refinement : ore
(D) adjustment : focus
(E) neutralization : acid

10. GRAVEL : PEBBLE ::

(A) river : water
(B) seasoning : salt
(C) crowd : person
(D) legislature : bill
(E) typewriter : key

11. STOCKADE : ENCLOSURE ::

(A) moat : bridge
(B) doorway : wall
(C) brick : building
(D) pillar : support
(E) keyhole : lock

12. SEDATIVE : PACIFY ::

(A) scalpel : cauterize
(B) analgesic : discomfit
(C) surgery : operate
(D) antiseptic : sterilize
(E) stimulant : induce

13. AUTHORITATIVE : ACCEPTANCE ::

(A) conspicuous : attention
(B) nebulous : validation
(C) congruous : appropriation
(D) maudlin : passion
(E) tangible : substance

14. ALACRITY : PROMPT ::

(A) service : kind
(B) aggravation : temperamental
(C) intuition : impulsive
(D) acumen : shrewd
(E) sentiment : thoughtful

15. UNDERSCORE : EMPHASIS ::

(A) eradicate : destruction
(B) stigmatize : confrontation
(C) quantify : assessment
(D) brand : ownership
(E) log : record

16. PREEMINENCE : IMPORTANCE ::

(A) predestination : belief
(B) prefiguration : reality
(C) premeditation : execution
(D) predisposition : preference
(E) preponderance : weight

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Recently some scientists have concluded that meteorites found on Earth and long believed to have a Martian origin might actually have been blasted free of Mars's gravity by the impact on Mars of other meteorites. This conclusion has led to another question: whether meteorite impacts on Earth have similarly driven rocks from this planet to Mars.

According to astronomer S.A. Phinney, kicking a rock hard enough to free it from Earth's gravity would require a meteorite capable of making a crater more than 60 miles across. Moreover, even if Earth rocks were freed by meteorite impact, Mars's orbit is much larger than Earth's, so Phinney estimates that the probability of these rocks hitting Mars is about one-tenth as great as that of Mars's rocks hitting Earth. To demonstrate this estimate, Phinney used a computer to calculate where 1,000 hypothetical particles would go if ejected from Earth in random directions. He found that 17 of the 1,000 particles would hit Mars.

17. The passage is primarily concerned with
    (A) presenting an argument to support a particular hypothesis
    (B) suggesting an answer to a theoretical question
    (C) questioning the assumptions of a research project
    (D) criticizing experimental results
    (E) explaining the origin of certain scientific data

18. According to the passage, which of the following events may have initiated the process that led to the presence on Earth of meteorites from Mars?
    (A) A meteorite struck the Earth with tremendous velocity.
    (B) A meteorite collided with Mars.
    (C) Approximately 1,000 rocks were ejected from Mars.
    (D) The orbits of Earth and Mars brought the planets to their closest points.
    (E) Rocks from a meteorite impact broke free of Earth's gravity.

19. The passage suggests that which of the following is true concerning the probability that a rock, if ejected from Mars, will hit the Earth?
    (A) The probability is increased when particles are ejected from Mars in random directions.
    (B) The probability is increased by the presence of large craters on the surface of Mars.
    (C) The probability is decreased when Mars's orbit brings the planet close to Earth.
    (D) The probability is greater than the probability that a rock from Earth will hit Mars.
    (E) The probability is less than the probability that a rock from Earth will escape Earth's gravity.

20. Which of the following, if true, would cast most doubt on Phinney's estimate of the probability of Earth rocks hitting Mars?
    (A) Rather than going in random directions, about 25 percent of all particles ejected from Earth go in the same direction into space.
    (B) Approximately 100 meteorites large enough to make a noticeable crater hit the Earth each year.
    (C) No rocks of Earth origin have been detected on Mars.
    (D) The velocity of rocks escaping from Earth's gravity is lower than the velocity of meteorites hitting the Earth.
    (E) No craters more than 60 miles across have been found on Mars.

GO ON TO THE NEXT PAGE.

A "scientistic" view of language was dominant among philosophers and linguists who affected to develop a scientific analysis of human thought and behavior in the early part of this century. Under the force of this view, it was perhaps inevitable that the art of rhetoric should pass from the status of being regarded as of questionable worth (because although it might be both a source of pleasure and a means to urge people to right action, it might also be a means to distort truth and a source of misguided action) to the status of being wholly condemned. If people are regarded only as machines guided by logic, as they were by these "scientistic" thinkers, rhetoric is likely to be held in low regard; for the most obvious truth about rhetoric is that it speaks to the whole person. It presents its arguments first to the person as a rational being, because persuasive discourse, if honestly conceived, always has a basis in reasoning. Logical argument is the plot, as it were, of any speech or essay that is respectfully intended to persuade people. Yet it is a characterizing feature of rhetoric that it goes beyond this and appeals to the parts of our nature that are involved in feeling, desiring, acting, and suffering. It recalls relevant instances of the emotional reactions of people to circumstances—real or fictional—that are similar to our own circumstances. Such is the purpose of both historical accounts and fables in persuasive discourse: they indicate literally or symbolically how people may react emotionally, with hope or fear, to particular circumstances. A speech attempting to persuade people can achieve little unless it takes into account the aspect of their being related to such hopes and fears.

Rhetoric, then, is addressed to human beings living at particular times and in particular places. From the point of view of rhetoric, we are not merely logical thinking machines, creatures abstracted from time and space. The study of rhetoric should therefore be considered the most humanistic of the humanities, since rhetoric is not directed only to our rational selves. It takes into account what the "scientistic" view leaves out. If it is a weakness to harbor feelings, then rhetoric may be thought of as dealing in weakness. But those who reject the idea of rhetoric because they believe it deals in lies and who at the same time hope to move people to action, must either be liars themselves or be very naïve; pure logic has never been a motivating force unless it has been subordinated to human purposes, feelings, and desires, and thereby ceased to be pure logic.

21. According to the passage, to reject rhetoric and still hope to persuade people is

(A) an aim of most speakers and writers
(B) an indication either of dishonesty or of credulity
(C) a way of displaying distrust of the audience's motives
(D) a characteristic of most humanistic discourse
(E) a way of avoiding excessively abstract reasoning

22. It can be inferred from the passage that in the late nineteenth century rhetoric was regarded as

(A) the only necessary element of persuasive discourse
(B) a dubious art in at least two ways
(C) an outmoded and tedious amplification of logic
(D) an open offense to the rational mind
(E) the most important of the humanistic studies

23. The passage suggests that the disparagement of rhetoric by some people can be traced to their

(A) reaction against science
(B) lack of training in logic
(C) desire to persuade people as completely as possible
(D) misunderstanding of the use of the term "scientistic"
(E) view of human motivation

24. The passage suggests that a speech that attempts to persuade people to act is likely to fail if it does NOT

(A) distort the truth a little to make it more acceptable to the audience
(B) appeal to the self-interest as well as the humanitarianism of the audience
(C) address listeners' emotions as well as their intellects
(D) concede the logic of other points of view
(E) show how an immediately desirable action is consistent with timeless principles

25. The passage suggests that to consider people as "thinking machines" (line 37) is to consider them as

(A) beings separated from a historical context
(B) replaceable parts of a larger social machine
(C) more complex than other animals
(D) liars rather than honest people
(E) infallible in their reasoning

GO ON TO THE NEXT PAGE.

26. Which of the following persuasive devices is NOT used in the passage?

(A) A sample of an actual speech delivered by an orator
(B) The contrast of different points of view
(C) The repetition of key ideas and expressions
(D) An analogy that seeks to explain logical argument
(E) Evaluative or judgmental words

27. Which of the following best states the author's main point about logical argument?

(A) It is a sterile, abstract discipline, of little use in real life.
(B) It is an essential element of persuasive discourse, but only one such element.
(C) It is an important means of persuading people to act against their desires.
(D) It is the lowest order of discourse because it is the least imaginative.
(E) It is essential to persuasive discourse because it deals with universal truths.

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. FLAMBOYANT: (A) competent (B) independent (C) aloof (D) subdued (E) unafraid

29. REBUFF: (A) tease (B) defy (C) meddle (D) welcome (E) challenge

30. ENRICH: (A) deplete (B) mitigate (C) forfeit (D) extinguish (E) occlude

31. PRETERNATURAL: (A) constant (B) protracted (C) factual (D) restrained (E) ordinary

32. GERMANE: (A) domestic (B) sympathetic (C) controversial (D) profound (E) inappropriate

33. INTEGRITY: (A) extravagance (B) incompleteness (C) subordinancy (D) insufficiency (E) opposition

34. MENDACITY : (A) full supply (B) loud response (C) impunity (D) truthfulness (E) peculiarity

35. VITUPERATE: (A) restore (B) respect (C) animate (D) praise (E) intensify

36. TEETOTALISM: (A) jingoism (B) proclivity (C) intemperance (D) intolerance (E) liberalism

37. REFULGENT: (A) lackluster (B) stiff (C) plodding (D) distant (E) weary

38. PROPITIATE: (A) elate (B) pester (C) incense (D) distract (E) forgive

SECTION 6

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-7

Exactly six different poems will appear in a coming issue of a magazine. Three of the poems—F, H, and L—are by the poet O, and the other three poems—R, S, and T—are by the poet W. Each poem will appear exactly once in the issue, and a poem must appear on each of the pages 10, 15, 20, 25, 30, and 35. The order in which the poems appear in the issue will be governed by the following conditions:

The poems on pages 10, 20, and 30 must all be by the same poet.
H must precede T.
R must precede L.

1. Which of the following is an acceptable order, from first to last, in which the poems can appear in the magazine?

(A) H, T, R, F, S, L
(B) L, S, H, T, F, R
(C) R, H, F, L, S, T
(D) R, H, T, F, S, L
(E) S, F, R, L, T, H

2. L could appear on any of the following pages EXCEPT

(A) 10
(B) 15
(C) 20
(D) 25
(E) 30

3. If S appears on page 15, which of the following poems must appear on page 25 ?

(A) F
(B) H
(C) L
(D) R
(E) T

4. If a poem by O appears on page 10, which of the following is a pair of poems either of which could appear on page 35 ?

(A) F and L
(B) F and R
(C) L and T
(D) R and S
(E) S and T

5. If F and S appear on pages 30 and 35, respectively, which of the following is a pair of poems that must appear on pages 10 and 15, respectively?

(A) H and L
(B) H and R
(C) H and T
(D) L and R
(E) L and T

6. If T appears on page 15, F must appear on which of the following pages?

(A) 10
(B) 20
(C) 25
(D) 30
(E) 35

7. If H appears on page 25, which of the following is a complete and accurate list of all the poems any one of which could appear on page 20 ?

(A) R
(B) T
(C) R, S
(D) S, T
(E) R, S, T

GO ON TO THE NEXT PAGE.

8. In a physical education class, 20 students were tested on archery target shooting. These students were then given a two-day training course in archery technique. The students were tested again and showed a 30 percent increase in accuracy. This result proves that the course was effective in increasing people's target-shooting accuracy.

   Which of the following, if true, gives the strongest support to the argument above?

   (A) The students were all excellent athletes, and excellent athletes tend to be good at target shooting.
   (B) The first testing session functioned as a practice session for the second testing session.
   (C) The accuracy with which people can shoot arrows is strongly related to the sharpness of their vision.
   (D) A similar group of students who were also tested on archery target shooting but were not given the course did not show an increase in accuracy.
   (E) Excellence in archery target shooting is an accomplishment achieved by relatively few of the people who take up the sport.

9. Because the number of surgeons is growing faster than the number of operations and because noninvasive medical therapies are increasingly replacing surgery, the average annual number of operations per surgeon has fallen by one-fourth in recent years. It can be concluded that, if these trends continue, a dangerous decline in the level of surgical skill will occur.

   The argument above is based on which of the following assumptions?

   (A) A surgeon's skill cannot be properly maintained unless the surgeon performs operations with a certain minimum frequency.
   (B) Surgeons now spend a large percentage of their time performing noninvasive medical procedures.
   (C) All doctors, but especially surgeons, are receiving poorer training in medical school than they were a few years ago.
   (D) The level of skill of each individual surgeon has declined in recent years.
   (E) Some experienced surgeons are now performing a greater number of operations than they used to perform.

10. Researchers who conducted a one-year study found that one marijuana cigarette deposits four times more tar in smokers' lungs than does one tobacco cigarette. The researchers concluded that marijuana smokers are more likely to suffer from tar-induced lung cancer than are tobacco smokers.

    Which of the following statements, if true, would most seriously weaken the researchers' conclusion described above?

    (A) The marijuana cigarettes used in the study were substantially smaller than the marijuana cigarettes smoked by the typical user.
    (B) None of the human participants in the study had ever smoked tobacco or marijuana in the past.
    (C) A follow-up examination conducted five years after the original study showed that none of the human participants had tar-induced lung cancer.
    (D) The tobacco cigarettes used in the study contained slightly more tar than the tobacco cigarettes smoked by the typical user.
    (E) The typical user of marijuana smokes much less frequently than does the typical user of tobacco.

GO ON TO THE NEXT PAGE.

Questions 11-16

A wild-animal hospital has its cages in a single row. Animals are housed one to a cage. To avoid disturbing the animals, the hospital does not house an animal of a predator species in a cage next to that of an animal of a species on which it preys. The animals the hospital can accept are of species Q, R, S, T, and U, which among them have only the following predator-prey relationships:

Q preys on R.
U preys on R.
Q preys on S.
S preys on T.

11. If the hospital has one animal of each of the five species, which of the following, in order, is an acceptable placement of the animals in consecutive cages?

(A) Q, S, R, T, U
(B) Q, T, U, S, R
(C) Q, U, T, S, R
(D) S, R, U, T, Q
(E) S, U, T, Q, R

12. If four animals, one each of species Q, R, S, and U, are to be placed in four consecutive cages, not necessarily in the order given, which of the following must be true?

(A) The Q and the R are each placed in an end cage of the four cages.
(B) The Q and the S are each placed in an end cage of the four cages.
(C) The Q and the U are not placed in cages adjacent to each other.
(D) The R and the S are not placed in cages adjacent to each other.
(E) The S and the U are not placed in cages adjacent to each other.

13. If four animals, one each of species Q, R, S, and T, are to be placed in four consecutive cages, not necessarily in the order given, the T must be placed next to

(A) the Q and in an end cage of the four cages
(B) the S and in an end cage of the four cages
(C) the R and in an inner cage of the four cages
(D) both the Q and the S
(E) either the Q or the R, but not both

14. If four animals, one each of species Q, S, T, and U, are to be placed in four consecutive cages, not necessarily in the order given, which of the following can be true?

(A) The S is in a cage adjacent to the cage of the Q.
(B) The S and the U are in end cages of the four cages.
(C) The T and the U are in end cages of the four cages.
(D) The Q and the U are in inner cages of the four cages.
(E) The S and the U are in inner cages of the four cages.

15. If the hospital has one animal of each species, and if they are to be placed in five consecutive cages with the T in the middle cage, which of the following must be true?

(A) The Q is placed in an end cage of the five cages.
(B) The R is placed in an end cage of the five cages.
(C) The Q is placed in a cage adjacent to the T's cage.
(D) The S is placed in a cage adjacent to the R's cage.
(E) The S is placed in a cage adjacent to the U's cage.

16. If the hospital has one animal of each species, to be placed in five consecutive cages, which of the following is true?

(A) The only animals that can be placed in end cages of the five cages are the Q and the U.
(B) The only animals that can be placed so that both are adjacent to the T are the R and the Q.
(C) The S and the U must not be placed in cages adjacent to each other.
(D) Any of the animals can be placed next to the R.
(E) Any of the animals can be placed in the middle cage of the five cages.

GO ON TO THE NEXT PAGE.

Questions 17-22

An experiment consists of eight steps—H, J, K, L, M, O, P, and S—that all must be performed. Three days are allotted for the experiment. Each step requires exactly one morning or else one afternoon to be performed, and at most two steps can be performed during any given morning or afternoon. The following restrictions must be observed:

- J must be performed on the second day.
- P must be performed in the morning.
- K and M must be performed at the same time as each other.
- J must be performed at some time after M has been completed and at some time after O has been completed.
- O must be completed at some time before P is performed and at some time before S is performed.

17. Which of the following can be the schedule for the steps of the experiment?

		Day One	Day Two	Day Three
(A)	Morning:	K, M	J, P	
	Afternoon:	H, L	O, S	
(B)	Morning:	K, M	H	P
	Afternoon:	O	L	J, S
(C)	Morning:	K, M	J	H, S
	Afternoon:	O	P	L
(D)	Morning:	M	K, O	P
	Afternoon:	L	J	H, S
(E)	Morning:	O	K, M	H, P
	Afternoon:	L	J	S

18. Which of the following must be completed at some time before J is performed?

(A) H
(B) K
(C) L
(D) P
(E) S

19. At the earliest, P can be performed during which of the following time periods?

(A) The morning of the first day
(B) The afternoon of the first day
(C) The morning of the second day
(D) The afternoon of the second day
(E) The morning of the third day

20. If J is performed in the morning, which of the following must be performed on the first day?

(A) H
(B) K
(C) L
(D) P
(E) S

21. If H and L are both performed on the first day, which of the following must be performed on the third day?

(A) K
(B) M
(C) O
(D) P
(E) S

22. If the experiment is to be completed by the end of the second day, which of the following must be performed on the second day?

(A) H
(B) K
(C) L
(D) O
(E) S

GO ON TO THE NEXT PAGE.

23. Fewer than half of the jobs in the United States conform even loosely to the standard forty-hour, nine-to-five weekday schedule, according to demographic experts. This is largely due to the rapid increase in the number of service firms and in the proportion of the United States labor force these firms employ, the experts say.

Which of the following, if true, best helps to explain how the growth of the service sector has had the effect noted above?

(A) In order to supplement their incomes, a small percentage of workers in other sectors of the economy take service-sector jobs as well.
(B) New service-sector firms have arisen to fill the need for day care for children, a need that was created by the increasing number of families in which both parents are employed.
(C) More part-time than full-time jobs have been created through the application of new technologies to traditional occupations.
(D) Manufacturing enterprises and other nonservice firms often operate twenty-four hours a day, seven days a week.
(E) The largest and fastest-growing segment of the service sector caters to leisure activities pursued outside the standard nine-to-five weekday schedule.

24. "Headhunters" are firms that, for a fee, undertake to recruit for their clients personnel who are greatly needed yet hard to find. The clients, in turn, require that they be off-limits to headhunters whose services they buy; i.e., headhunters cannot raid one client's staff on behalf of other clients.

Of the following, which would, if feasible, be the best strategy for a company to pursue if that company wanted both to use headhunters to fill a vacancy and, if successful in filling the vacancy, to reduce the risk of losing the newly hired employee to a competitor?

(A) Find out which headhunters recruit workers of the sort being sought and employ all those headhunters.
(B) Find out which headhunter has the highest success rate in recruiting for its clients and hire that firm.
(C) Find out how much the company's competitors currently pay staff of the sort being sought and offer to pay prospective employees higher salaries.
(D) Find out whether any of the company's competitors are seeking to recruit workers of the sort being sought and, if so, make sure not to hire the same headhunters that they hire.
(E) Find out which of the company's competitors are on the client lists of the headhunters who are being considered for the job.

GO ON TO THE NEXT PAGE.

25. Angler: Fish such as suckers, shiners, and chubs are neither fun to catch nor good to eat. They should be eliminated from mountain ponds to make way for trout.

Fish and Game Commissioner: The state's policy is to preserve any aquatic ecosystems that are indigenous to a given area. Interfering with fish populations in these ponds would violate this policy.

Which of the following, if true, would cast most doubt on the Fish and Game Commissioner's position that the angler's proposal is a violation of state policy?

(A) The suckers, shiners, and chubs in mountain ponds are descendants of fish brought to those ponds by anglers for use as bait in catching the once abundant trout.
(B) The state's policy of preserving natural aquatic ecosystems favors the interests and hobbies of one group of people over those of other groups.
(C) Suckers, shiners, and chubs are dull, unattractive fish with none of the graceful beauty of trout.
(D) People who fish in mountain ponds have a deeper appreciation of nature than do people who never visit such areas.
(E) A large percentage of the fish in mountain ponds could be eliminated and replaced with trout without seriously disturbing any plants or animals in the surrounding woodlands.

SECTION 7

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

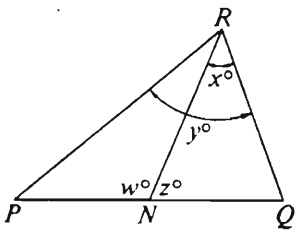
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

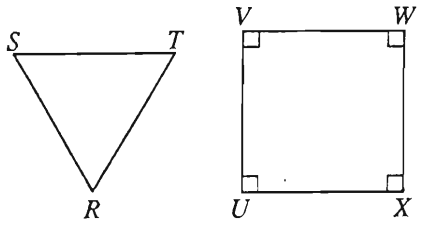


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	$\dfrac{5 - \frac{1}{10}}{10 + \frac{1}{10}}$	$\frac{1}{2}$



$RS = ST = TR = UV = VW = WX = XU$

	Column A	Column B
2.	The area of region RST	The area of region $UVWX$

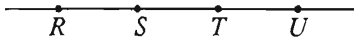
A car traveling at a constant speed of 50 miles per hour uses k gallons of fuel each hour.

	Column A	Column B
3.	The number of gallons of fuel this car uses to travel 200 miles at a constant speed of 50 miles per hour	$4k$

$$\frac{1}{10} \times N = 1$$

$$\frac{1}{10} + R = 1$$

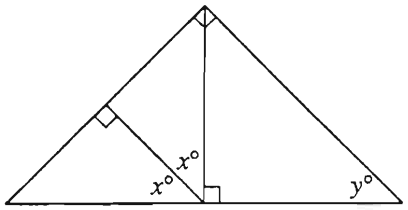
	Column A	Column B
4.	N	R



	Column A	Column B
5.	RT	SU

$$4t + 5 = 5t - 30$$

	Column A	Column B
6.	t	30



	Column A	Column B
7.	x	y

	Column A	Column B
8.	$(0.3)^2$	$\left(\frac{1}{2}\right)^2\left(\frac{1}{5}\right)^2(3)^2$

$$|n| = 61$$

$$|n - 1| = 62$$

	Column A	Column B
9.	n	61

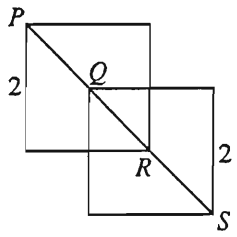
Of the 7 members of the city council, 4 are Democrats and 3 are Republicans. T is the total number of different 3-person committees that can be appointed from the council membership such that each committee consists of 2 Democrats and 1 Republican.

	Column A	Column B
10.	T	15

GO ON TO THE NEXT PAGE.

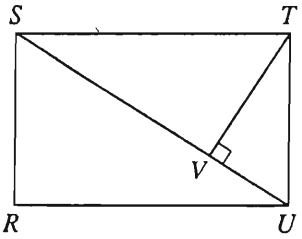
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Column A	Column B
The average (arithmetic mean) of k numbers is 27, and k is greater than 10.	
11. The sum of the k numbers	300

Column A	Column B
 Q and R are the centers of the two squares with sides of length 2.	
12. The length of line segment PS	$3\sqrt{2}$

Column A	Column B
32 percent of x is 75. x is k percent of 75.	
13. k	300

Column A	Column B
$xy = 6$ $x^2 = 9$	
14. x	y

Column A	Column B
	
15. The area of rectangular region $RSTU$	$(TV)(SU)$

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. A buzzer sounds every 15 minutes. If the buzzer sounded at 12:40, which of the following could be a time at which the buzzer sounded?

(A) 4:05
(B) 5:30
(C) 6:45
(D) 7:15
(E) 8:10

17. $\frac{1}{32} + \frac{1}{32} + \frac{1}{16} + \frac{1}{8} + \frac{1}{4} + \frac{1}{2} =$

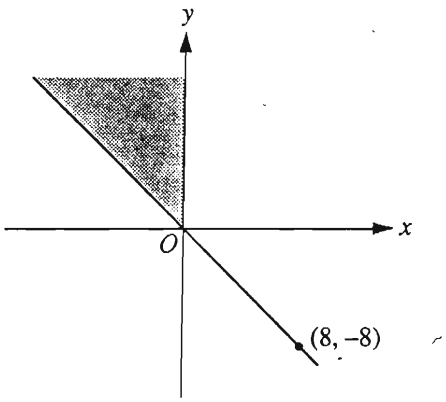
(A) $\frac{3}{4}$

(B) $\frac{15}{16}$

(C) $\frac{31}{32}$

(D) 1

(E) $\frac{3}{2}$



18. Of the following pairs of coordinates, which represents a point in the shaded region on the graph shown above?

(A) $(3, -5)$
(B) $(-3, -5)$
(C) $(-3, 5)$
(D) $(-5, 3)$
(E) $(-5, -3)$

19. If $x = 2w$, $z = 3x$, and $wz \neq 0$, what is the value of $\frac{x^2}{wz}$?

(A) $\frac{2}{3}$

(B) 1

(C) $\frac{4}{3}$

(D) 4

(E) 6

20. If $x \geq 8$ and $y \leq 3$, then it must be true that

(A) $x + y \geq 5$
(B) $x + y \leq 11$
(C) $x - y \geq 5$
(D) $x - y \leq 5$
(E) $x - y \leq 11$

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following chart.

ENROLLMENT, FACULTY SIZE, FACULTY SALARY, AND TUITION AT COLLEGE *R* FOR SELECTED YEARS

	1960	1970	1980
Number of Students Enrolled	1,490	1,600	1,790
Number of Faculty Members	166	160	---
Ratio of Students to Faculty	---	$\frac{10}{1}$	$\frac{11}{1}$
Average* Faculty Salary	---	$14,360	$28,400
Tuition per Student	$1,400	$2,000	$3,700
Total Faculty Salaries	$1,245,000	---	$4,629,200
Income from Tuition	$2,086,000	$3,200,000	---

*Arithmetic mean

21. What was the total amount of faculty salaries at College *R* in 1970 ?

(A) $143,600
(B) $200,600
(C) $256,000
(D) $2,045,000
(E) $2,297,600

22. The number of students enrolled in 1960 was approximately what fraction of the number enrolled in 1980 ?

(A) $\frac{8}{9}$
(B) $\frac{5}{6}$
(C) $\frac{2}{3}$
(D) $\frac{1}{3}$
(E) $\frac{1}{5}$

GO ON TO THE NEXT PAGE.

23. If the increase in the number of students enrolled from 1950 to 1960 was half the increase from 1960 to 1970, what was the student enrollment in 1950 ?

(A) 745
(B) 1,340
(C) 1,380
(D) 1,435
(E) 1,545

24. The increase in tuition per student from 1970 to 1980 was approximately how many times as great as the increase from 1960 to 1970 ?

(A) 2
(B) $2\frac{1}{2}$
(C) 3
(D) $3\frac{1}{2}$
(E) 4

25. If the total amount of faculty salaries in 1980 was paid from tuition income, approximately how much of each student's tuition was used to pay faculty salaries?

(A) \$160
(B) \$1,100
(C) \$1,250
(D) \$2,600
(E) \$3,700

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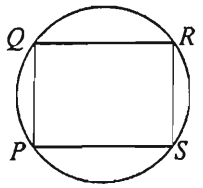


26. In the figure above, rectangle $PQRS$ is inscribed in the circle and $PQ = 6$. If the area of rectangular region $PQRS$ is 48, what is the area of the circular region?

(A) 10π
(B) 25π
(C) 36π
(D) 48π
(E) 100π

27. The expression $\dfrac{\frac{1}{n}}{1 - \frac{1}{n}}$, where n is not equal to 0 or 1, is equivalent to which of the following?

(A) $\dfrac{1}{n - 1}$

(B) $\dfrac{1}{1 - n}$

(C) $n - 1$

(D) $\dfrac{n}{n - 1}$

(E) $\dfrac{n}{1 - n}$

28. A cyclist travels x miles in w hours and z minutes. What is the cyclist's speed in miles per hour?

(A) $\dfrac{x}{w + 60z}$

(B) $\dfrac{60w + z}{x}$

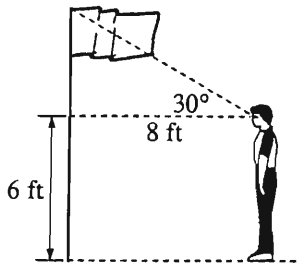
(C) $\dfrac{60x}{w + z}$

(D) $\dfrac{w + z}{x}$

(E) $\dfrac{60x}{60w + z}$

29. $3^{20} + 3^{20} + 3^{20} =$

(A) 9^{60}
(B) 9^{20}
(C) 3^{60}
(D) 3^{23}
(E) 3^{21}



30. In the figure above, a student whose eyes are 6 feet above the ground and 8 feet from a vertical flagpole views the top of the flagpole at a 30-degree angle of elevation. What is the height, in feet, of the flagpole?

(A) $6 + 8\sqrt{3}$

(B) 14

(C) $\dfrac{16}{\sqrt{3}}$

(D) $6 + \dfrac{8}{\sqrt{3}}$

(E) 10

FOR GENERAL TEST 10 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 1			Section 4		
Number	Answer	P+	Number	Answer	P+
1	E	94	1	A	93
2	D	88	2	A	88
3	C	82	3	B	86
4	C	80	4	E	95
5	B	71	5	B	85
6	A	59	6	E	75
7	D	38	7	A	51
8	B	88	8	C	89
9	C	85	9	E	87
10	E	81	10	C	74
11	D	71	11	D	68
12	E	48	12	D	73
13	A	48	13	A	45
14	E	43	14	D	39
15	E	34	15	D	28
16	D	30	16	E	21
17	E	74	17	B	56
18	D	71	18	B	76
19	E	65	19	D	82
20	A	71	20	A	51
21	E	40	21	B	65
22	B	30	22	B	35
23	C	31	23	E	51
24	D	58	24	C	76
25	C	50	25	A	50
26	B	26	26	A	84
27	C	45	27	B	60
28	E	84	28	D	91
29	B	82	29	D	77
30	A	72	30	A	90
31	C	64	31	E	53
32	C	51	32	E	40
33	D	41	33	B	42
34	A	38	34	D	42
35	D	34	35	D	33
36	B	31	36	C	35
37	E	25	37	A	33
38	A	19	38	C	23

QUANTITATIVE ABILITY					
Section 3			Section 7		
Number	Answer	P+	Number	Answer	P+
1	A	85	1	B	70
2	C	88	2	B	87
3	A	74	3	C	82
4	B	72	4	A	75
5	D	76	5	D	79
6	C	70	6	A	78
7	A	73	7	C	75
8	B	78	8	C	53
9	B	66	9	B	57
10	A	66	10	A	49
11	D	55	11	D	58
12	B	38	12	C	49
13	D	25	13	A	33
14	C	32	14	D	36
15	C	39	15	C	33
16	C	88	16	E	85
17	D	70	17	D	89
18	C	66	18	C	79
19	B	50	19	A	63
20	A	50	20	C	53
21	B	87	21	E	75
22	E	75	22	B	67
23	D	64	23	D	71
24	D	50	24	C	58
25	A	25	25	D	43
26	B	64	26	B	43
27	A	61	27	A	42
28	B	44	28	E	33
29	D	26	29	E	20
30	E	26	30	D	32

ANALYTICAL ABILITY					
Section 2			Section 6		
Number	Answer	P+	Number	Answer	P+
1	D	93	1	D	79
2	C	47	2	A	77
3	B	60	3	D	64
4	D	70	4	E	68
5	C	59	5	B	59
6	A	55	6	B	69
7	D	66	7	C	70
8	E	79	8	D	80
9	B	66	9	A	86
10	B	74	10	E	63
11	A	70	11	B	88
12	C	32	12	A	72
13	A	61	13	C	57
14	E	46	14	D	56
15	A	50	15	D	38
16	A	41	16	E	26
17	D	47	17	E	54
18	A	39	18	B	52
19	A	32	19	C	50
20	E	23	20	B	52
21	D	42	21	D	31
22	E	32	22	E	33
23	B	68	23	E	45
24	D	63	24	A	18
25	B	51	25	A	55

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 10 ONLY AND THE PERCENTS BELOW*

Raw Score	Verbal Scaled Score	Verbal % Below	Quantitative Scaled Score	Quantitative % Below	Analytical Scaled Score	Analytical % Below	Raw Score	Verbal Scaled Score	Verbal % Below	Quantitative Scaled Score	Quantitative % Below	Analytical Scaled Score	Analytical % Below
74-76	800	99					39	420	31	620	62	680	85
73	790	99					38	420	31	610	60	670	83
72	780	99					37	410	28	600	58	650	79
71	770	99					36	400	25	580	53	640	77
70	760	99					35	390	22	570	50	630	74
							34	380	20	560	48	620	72
69	740	98					33	370	18	550	46	600	66
68	730	97					32	360	15	540	43	590	64
67	720	96					31	360	15	520	39	580	61
66	710	95					30	350	13	510	36	560	56
65	700	94											
64	680	93					29	340	11	500	34	550	52
63	670	91					28	340	11	490	32	540	49
62	660	90					27	330	9	480	30	520	44
61	650	88					26	320	8	460	25	510	41
60	640	87	800	96			25	310	7	450	23	490	36
							24	300	5	440	21	480	33
59	620	84	800	96			23	300	5	430	19	460	28
58	610	82	790	95			22	290	4	420	17	450	26
57	600	80	780	93			21	280	3	400	14	440	23
56	590	78	780	93			20	270	2	390	12	420	19
55	580	76	770	92									
54	570	73	760	90			19	260	2	380	11	410	17
53	560	71	750	88			18	250	1	370	9	390	14
52	550	69	750	88			17	240	1	350	7	380	12
51	540	66	740	87			16	230	1	340	6	370	11
50	530	63	730	84	800	98	15	220	1	330	5	350	8
							14	210	1	310	3	330	6
49	520	60	720	82	800	98	13	200	1	300	3	320	5
48	510	58	710	80	800	98	12	200	1	280	2	300	3
47	500	55	700	78	790	98	11	200	1	270	1	290	3
46	490	52	690	77	780	97	10	200	1	250	1	280	2
45	480	50	680	75	760	96							
44	470	47	670	73	750	95	9	200	1	240	1	260	1
43	460	43	660	70	730	93	8	200	1	230	1	250	1
42	450	40	650	68	720	92	7	200	1	210	1	230	1
41	440	37	640	66	710	90	6	200	1	200	1	220	1
40	430	34	630	64	690	87	5	200	1	200	1	210	1
							0-4	200	1	200	1	200	1

*Percent scoring below the scaled score is based on the performance of 1,040,336 examinees who took the General Test between October 1, 1988, and September 30, 1991. This percent below information is used for score reports during the 1992-93 testing year.

TEST 11

SECTION 1

Time — 30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

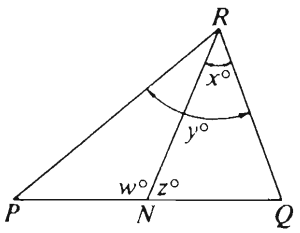
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

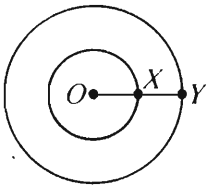
	Column A	Column B
	$n > 1$	
1.	$\frac{n}{n+1} + 1$	$1 - \frac{1}{n+1}$

Maria purchased 3 pounds of candy X for \$7.98 and 5 pounds of candy Y for \$10.95.

2.	The price Maria paid per pound for candy X	The price Maria paid per pound for candy Y

x is an integer greater than 1.

3.	$2x + 5$	$5x + 2$
4.	$3(2^5)$	$5(3^2)$



O is the center of the two circles and $OX = XY = 1$.

5.	Half the circumference of the larger circle	The circumference of the smaller circle

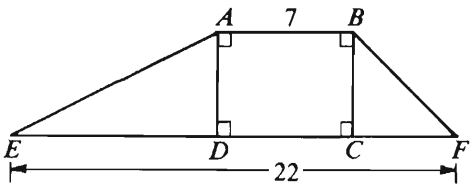
$tq = 0$
$rq = 1$

6.	t	0
7.	0.9×0.9	$0.9 \times 0.9 \times 0.9$

A student can purchase a research report for \$5.00, or reproduce the x pages of the report at a cost of \$0.15 per page.

8.	The greatest possible value of x if the cost of reproducing the x pages is less than the cost of purchasing the report	34

	Column A	Column B



9.	The area of rectangular region $ABCD$	The area of triangular region ADE

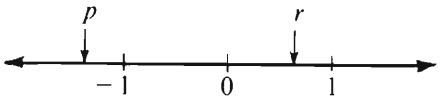
$x < y < 0$

10.	$x + y$	xy

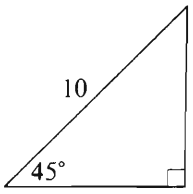
In $\triangle ABC$, $AB = BC$.

11.	The measure of $\angle B$	60°

Questions 12-13 refer to the following number line.



12.	$-p$	r
13.	$p + r$	$r - p$



14.	The area of the triangular region	25

The length of a rectangular garden is increased by p percent and its width is decreased by p percent.

15.	The area of the new garden if $p = 10$	The area of the new garden if $p = 20$

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. Which of the following is NOT a divisor of 264 ?

(A) 4
(B) 8
(C) 9
(D) 11
(E) 12

17. If $3(x + 1) = 4x - 1$, then $x =$

(A) $\frac{4}{7}$

(B) $\frac{3}{4}$

(C) 2

(D) 3

(E) 4

18. If 55 percent of the people who purchase a certain product are female, what is the ratio of the number of females who purchase the product to the number of males who purchase the product?

(A) $\frac{11}{9}$

(B) $\frac{10}{9}$

(C) $\frac{9}{10}$

(D) $\frac{9}{11}$

(E) $\frac{5}{9}$

19. C is a circle, L is a line, and P is a point on line L. If C, L, and P are in the same plane and P is inside C, how many points do C and L have in common?

(A) 0
(B) 1
(C) 2
(D) 3
(E) 4

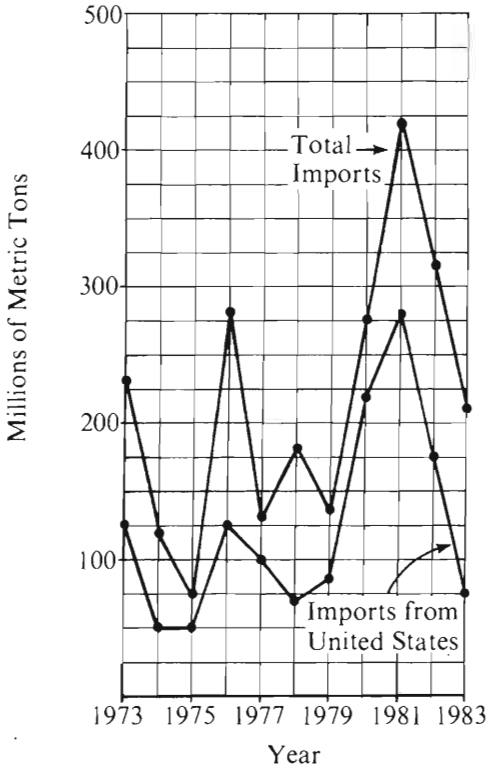
20. If one number exceeds another number by 13 and the larger number is $\frac{3}{2}$ times the smaller number, then the smaller number is

(A) 13
(B) 26
(C) 31
(D) 39
(E) 65

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graph.

COUNTRY X'S TOTAL WHEAT IMPORTS COMPARED TO ITS WHEAT IMPORTS FROM THE UNITED STATES, 1973-1983



Note: Drawn to scale.

21. From 1973 to 1977, inclusive, how many million metric tons of wheat did Country X import from the United States?

(A) 450
(B) 400
(C) 350
(D) 320
(E) 250

22. For how many of the years shown did Country X import more than 200 million metric tons of wheat?

(A) Two
(B) Five
(C) Six
(D) Seven
(E) Eight

23. The amount of wheat Country X imported from countries other than the United States was greatest in which of the following years?

(A) 1974
(B) 1976
(C) 1978
(D) 1981
(E) 1983

24. For the year in which total wheat imports and wheat imports from the United States were most nearly equal, how many million metric tons of wheat did Country X import?

(A) 150
(B) 125
(C) 90
(D) 75
(E) 50

25. For the year in which the amount of Country X's total wheat imports was greatest, approximately what percent of that total was imported from the United States?

(A) 35%
(B) 40%
(C) 50%
(D) 65%
(E) 75%

GO ON TO THE NEXT PAGE.

26. $\left(2 + \frac{3}{4}\right)^2 - \left(2 - \frac{1}{4}\right)^2 =$

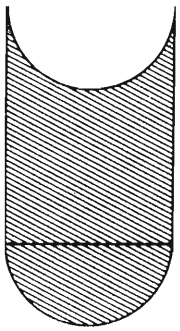
(A) $\frac{37}{8}$

(B) $\frac{9}{2}$

(C) 3

(D) 1

(E) $\frac{1}{2}$



27. If each curved side in the figure above is a semicircle with radius 20, and the two parallel sides each have length 100, what is the area of the shaded region?

(A) 2,000
(B) 4,000
(C) $2{,}000 - 200\pi$
(D) $4{,}000 - 200\pi$
(E) $4{,}000 - 400\pi$

28. If the degree measures of the angles of a triangle are in the ratio 3 : 4 : 5, what is the degree measure of the smallest angle?

(A) 15°
(B) 30°
(C) 45°
(D) 60°
(E) 75°

29. A board of length L feet is cut into two pieces such that the length of one piece is 1 foot more than twice the length of the other piece. Which of the following is the length, in feet, of the longer piece?

(A) $\frac{L + 2}{2}$

(B) $\frac{2L + 1}{2}$

(C) $\frac{L - 1}{3}$

(D) $\frac{2L + 3}{3}$

(E) $\frac{2L + 1}{3}$

30. How many positive integers are both multiples of 4 and divisors of 64 ?

(A) Two
(B) Three
(C) Four
(D) Five
(E) Six

SECTION 2

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-4

A group of three objects must be selected from six objects—K, O, S, T, V, and W—according to the following conditions:

Either K or S, or both, must be selected.
Either O or V must be selected, but neither V nor S can be selected with O.

1. Which of the following is an acceptable selection of objects?

(A) K, O, and S
(B) K, S, and T
(C) K, S, and V
(D) O, S, and V
(E) O, T, and V

2. Which of the following pairs of objects CANNOT both be among the objects selected?

(A) K and O
(B) K and T
(C) O and W
(D) T and W
(E) V and W

3. If S is selected, which of the following must also be among the objects selected?

(A) K
(B) O
(C) T
(D) V
(E) W

4. If V is not selected, which pair of objects must be among those selected?

(A) K and O
(B) K and T
(C) K and W
(D) O and T
(E) O and W

GO ON TO THE NEXT PAGE.

5. Research has proved that eating lots of fish greatly decreases the risk of developing heart disease. The key factor providing protection has been identified as omega-3 fatty acids, a family of fatty acids found in fish oils. Therefore, if people take dietary supplements of omega-3's in capsule form, they will decrease their risk of developing heart disease.

   Which of the following, if true, would most seriously weaken the conclusion drawn above?

   (A) Some dietary supplements have been shown to have harmful side effects.
   (B) Omega-3's occur in extremely low quantities in some kinds of fish.
   (C) Omega-3's are effective only because they interact with other substances found mainly in fish.
   (D) The majority of people who eat fish say that they do so because they like the taste of fish.
   (E) Researchers have found evidence that fish oil supplements would also reduce the effects of asthma and arthritis for some persons.

6. It is no wonder that some domestic car companies have to attract potential buyers with rebates and low interest rates. Why do not those companies produce cars that are more fuel-efficient? If all domestic manufacturers built cars that were as fuel-efficient as imported cars, rebates and low interest rates would not be needed.

   The argument above would be most strengthened if which of the following were true?

   (A) The offer of rebates has always signified that an industry is in decline.
   (B) For a majority of buyers of new cars, high fuel efficiency is the most important criterion in choosing a car.
   (C) Some cars built by domestic manufacturers are more fuel-efficient than many of the popular imported cars.
   (D) Many car buyers prefer to purchase midsize and larger cars.
   (E) Many car buyers rate operating costs as less important than initial purchase price when choosing a car.

7. Ergot is a fungus that can infest the seed heads of any grain crop but is common only on rye. Ergot contains chemicals poisonous to humans.

   Rye was introduced in Europe in the Middle Ages as a crop for land too poor and damp for wheat to grow well. Thus, rye tended to be the staple of the poorer peasants.

   Which of the following hypotheses is best supported by the information above?

   (A) Ergot did not occur in Europe prior to the Middle Ages.
   (B) People in the Middle Ages were well aware of the toxicity of ergot.
   (C) Before the introduction of rye, no attempts had been made to cultivate the poor and damp land in Europe.
   (D) In Europe during the Middle Ages, prosperous people were less at risk from ergot poisoning than poor people were.
   (E) Prior to the Middle Ages, Europe was as densely populated as dependence on a single grain crop permitted.

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Questions 8-12

A map representing countries R, S, W, X, Y, and Z is to be drawn. Adjacent countries cannot be the same color on the map.

The only countries adjacent to each other are as follows:

R, S, X, and Y are each adjacent to W.
X is adjacent to Y.
R and S are each adjacent to Z.

8. Which of the following is a pair of countries that must be different in color from each other?

(A) R and X
(B) S and X
(C) S and Z
(D) X and Z
(E) Y and Z

9. If X is the same color as Z, then it must be true that

(A) R is the same color as Y
(B) S is the same color as X
(C) X is the same color as Y
(D) S is a different color from any other country
(E) W is a different color from any other country

10. Which of the following is a pair of countries that can be the same color as each other?

(A) R and S
(B) S and W
(C) W and X
(D) W and Y
(E) X and Y

11. Which of the following countries can be the same color as W?

(A) R
(B) S
(C) X
(D) Y
(E) Z

12. If the fewest possible colors are used and one of the countries is the only one of a certain color, that country could be

(A) W, but not any of the other countries
(B) Z, but not any of the other countries
(C) R or S, but not any of the other countries
(D) W or X or Y, but not any of the other countries
(E) W or Y or Z, but not any of the other countries

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Questions 13-18

Three sizes of hats—small, medium, and large—are stored in four sealed boxes.
For each of the three sizes of hats, there are exactly three boxes that contain that size.
Four labels accurately reflecting the contents of the boxes were prepared.
However, only two of the labels were placed on the correct boxes, and the other two labels were placed on the wrong boxes.
As a result, the boxes are labeled as follows:

Box 1—Small and medium
Box 2—Small and large
Box 3—Medium and large
Box 4—Small, medium, and large

13. If box 3 actually contains no small hats, which of the following must be true?

(A) Box 1 is correctly labeled.
(B) Box 2 is correctly labeled.
(C) Box 3 is correctly labeled.
(D) Box 1 contains no small hats.
(E) Box 2 contains no medium-sized hats.

14. If box 4 actually contains no small hats, which of the following must be true?

(A) Box 3 is correctly labeled.
(B) Box 4 is correctly labeled.
(C) Box 1 is incorrectly labeled.
(D) Box 2 is incorrectly labeled.
(E) Box 3 is incorrectly labeled.

15. If box 1 is correctly labeled, which of the following must be true?

(A) Box 2 contains no small hats.
(B) Box 2 contains no medium-sized hats.
(C) Box 2 contains no large hats.
(D) Box 4 contains some small hats.
(E) Box 4 contains some large hats.

16. If box 1 and box 4 are the mislabeled boxes, which of the following must be true?

(A) Box 1 contains some hats of all three sizes.
(B) Box 2 contains some hats of all three sizes.
(C) Box 3 contains some hats of all three sizes.
(D) Box 3 contains no medium-sized hats.
(E) Box 3 contains no large hats.

17. If box 1 and box 4 are the correctly labeled boxes, which of the following must be true?

(A) Both box 1 and box 2 contain small hats.
(B) Both box 1 and box 2 contain medium-sized hats.
(C) Both box 1 and box 3 contain medium-sized hats.
(D) Both box 2 and box 3 contain small hats.
(E) Both box 3 and box 4 contain medium-sized hats.

18. If at least small and medium-sized hats are known to be in box 4, which of the following must be true?

(A) If box 1 contains at least small and medium-sized hats, box 2 contains large hats.
(B) If box 1 contains only small and medium-sized hats, box 2 contains small hats.
(C) If box 2 contains only small and medium-sized hats, box 1 does not contain small hats.
(D) If box 2 contains at least medium-sized and large hats, box 4 does not contain large hats.
(E) If box 3 contains at least small and large hats, box 2 does not contain large hats.

GO ON TO THE NEXT PAGE.

Questions 19-22

A snowplow driver must clear all six shipping terminals—F, G, H, J, N, R—of snow one at a time. The sequence in which the clearing is done must conform to the following specific rules:

Terminal R must be cleared sometime before terminal F and also sometime before terminal N.
Terminal G must be cleared sometime after terminal F and also sometime after terminal J.
Terminal H cannot be cleared immediately before or immediately after terminal J.
A terminal that is about to receive shipments must, when it is consistent with the rules above, be cleared before a terminal that is not.

19. If H and N alone are about to receive shipments, the terminals can be cleared in which of the following sequences?

(A) R, N, F, H, G, J
(B) H, N, R, J, F, G
(C) R, H, F, N, J, G
(D) H, R, N, J, F, G
(E) R, N, F, J, G, H

20. If J alone is about to receive shipments, the terminals can be cleared in which of the following sequences?

(A) J, F, H, G, R, N
(B) J, H, G, R, F, N
(C) J, R, N, F, H, G
(D) R, F, N, J, H, G
(E) R, J, G, F, N, H

21. If G and N alone are about to receive shipments, which of the following must be true?

(A) N is cleared first.
(B) R is cleared second.
(C) J is cleared third.
(D) F is cleared fourth.
(E) H is cleared sixth.

22. If G and J alone are about to receive shipments, then the terminals can be cleared in which of the following sequences?

(A) R, J, F, G, H, N
(B) R, J, G, N, F, H
(C) J, G, R, H, F, N
(D) J, R, F, N, G, H
(E) J, R, F, G, N, H

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23. During the last twenty years, eleven percent of those people who received certification to practice in a particular profession were women, and all those people who received certification during those years obtained full-time positions. Nevertheless, only five percent of the full-time positions in this profession are currently held by women.

Which of the following, if true, could explain the difference in the percentages mentioned in the passage above?

(A) It was easier to obtain certification twenty years ago than it is currently.
(B) The majority of those currently in the profession were hired more than twenty years ago, when virtually everyone in the profession was male.
(C) The women certified in the last twenty years have tended to choose different specialties within the profession than the men have tended to choose.
(D) Male and female members of the profession have been paid according to equal pay scales for all of the past twenty years.
(E) Although women currently hold five percent of the full-time positions in the profession, they hold only two percent of the supervisory positions.

24. To be mentally healthy, people must have self-respect. People can maintain self-respect only by continually earning the respect of others they esteem. They can earn this respect only by treating these others morally.

Which of the following conclusions can be properly drawn from the statements above?

(A) People who are mentally healthy will be treated morally by others.
(B) People who are mentally healthy will have treated morally those they esteem.
(C) People who are mentally healthy must have self-respect in order to be treated morally by others.
(D) People can expect to be treated morally by others only if they esteem these others.
(E) People who have self-respect seldom treat morally those they esteem.

25. People often recall having felt chilled before the onset of a cold. This supports the hypothesis that colds are, at least sometimes, caused by becoming chilled; it is the chill that allows a rhinovirus, if present, to infect a person.

Which of the following, if true, most seriously weakens the force of the evidence cited above?

(A) Being chilled is a form of stress, and stress lowers the defenses of a person's immune system, which guards against infection.
(B) After a rhinovirus has incubated in a person for several days, the first symptom it causes is a feeling of chilliness.
(C) People who are tired and then become chilled are more likely to catch severe colds than are people who are chilled without being tired.
(D) Some people who catch colds are not sure what it was that allowed them to catch cold.
(E) Rhinoviruses are not always present in the environment, and so a person could become chilled without catching a cold.

SECTION 3

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. With its maverick approach to the subject, Shere Hite's book has been more widely debated than most; the media throughout the country have brought the author's ------- opinions to the public's attention.

   (A) controversial
   (B) authoritative
   (C) popular
   (D) conclusive
   (E) articulate

2. Though many medieval women possessed devotional books that had belonged to their mothers, formal written evidence of women bequeathing books to their daughters is scarce, which suggests that such bequests were ------- and required no -------.

   (A) unselfish. .rationalization
   (B) tangential. .approval
   (C) customary. .documentation
   (D) covert. .discretion
   (E) spurious. .record

3. Although their initial anger had ------- somewhat, they continued to ------- the careless worker who had broken the machine.

   (A) blazed. .assail
   (B) diminished. .appease
   (C) abated. .berate
   (D) subsided. .condone
   (E) intensified. .torment

4. Borrowing a copyrighted book from a library amounts to a form of theft ------- by entrenched custom: the copyright owner's property, the book, is used repeatedly without ------- for such use.

   (A) engendered. .application
   (B) anticipated. .acknowledgment
   (C) sanctioned. .compensation
   (D) provoked. .adjustment
   (E) perpetrated. .permission

5. The notion that a parasite can alter the behavior of a host organism is not mere fiction; indeed, the phenomenon is not even -------.

   (A) observable (B) real (C) comprehended (D) rare (E) imaginable

6. Although Shakespeare received little formal education, scholarship has in recent years ------- the view that he was ------- the work of classical authors.

   (A) substantiated. .unimpressed by
   (B) eroded. .obsessed by
   (C) supported. .oblivious to
   (D) questioned. .influenced by
   (E) undermined. .unfamiliar with

7. Darwin's method did not really ------- the idea of race as an important conceptual category; even the much more central idea of species was little more than a theoretical -------.

   (A) require. .convenience
   (B) apply. .measurement
   (C) exclude. .practice
   (D) subsume. .validation
   (E) reject. .fact

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. DENTURE : TEETH :: (A) scarf : head
(B) toupee : hair (C) fingernail : hand
(D) eyebrow : eye (E) bandage : wound

9. PROFESSIONAL : ROOKIE :: (A) player : fan
(B) ranger : cowhand (C) prisoner : thief
(D) soldier : recruit (E) conductor : musician

10. SCRIPT : PLAY :: (A) refrain : song
(B) assignment : course (C) score : symphony
(D) collection : story (E) debate : candidate

11. BUOYANT : SINK :: (A) frozen : melt
(B) liquid : evaporate (C) brittle : cleave
(D) insoluble : dissolve (E) gaseous : expand

12. CRAWL : PROCEED :: (A) plummet : descend
(B) nurture : grow (C) inundate : flood
(D) rampage : destroy (E) dwindle : decrease

13. ELEGY : SORROW ::
(A) paean : distress
(B) encomium : criticism
(C) requiem : euphoria
(D) tirade : joy
(E) eulogy : admiration

14. FRIEZE : ORNAMENT :: (A) arch : divide
(B) relief : form (C) arabesque : accentuate
(D) nave : border (E) pillar : support

15. DECELERATE : SPEED ::
(A) desiccate : dryness
(B) extinguish : oxygen
(C) interpolate : interval
(D) decontaminate : sterility
(E) enervate : vitality

16. DESPOTIC : TYRANNY ::
(A) authoritarian : superiority
(B) skillful : celebrity
(C) generous : liberality
(D) suspect : illegality
(E) peaceful : benevolence

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

(The article from which the passage was taken appeared in 1982.)

Theorists are divided concerning the origin of the Moon. Some hypothesize that the Moon was formed in the same way as were the planets in the inner solar system (Mercury, Venus, Mars, and Earth)—from planet-forming materials in the presolar nebula. But, unlike the cores of the inner planets, the Moon's core contains little or no iron, while the typical planet-forming materials were quite rich in iron. Other theorists propose that the Moon was ripped out of the Earth's rocky mantle by the Earth's collison with another large celestial body after much of the Earth's iron fell to its core. One problem with the collision hypothesis is the question of how a satellite formed in this way could have settled into the nearly circular orbit that the Moon has today. Fortunately, the collision hypothesis is testable. If it is true, the mantlerocks of the Moon and the Earth should be the same geochemically.

17. The primary purpose of the passage is to
    (A) present two hypotheses concerning the origin of the Moon
    (B) discuss the strengths and weaknesses of the collision hypothesis concerning the origin of the Moon
    (C) propose that hypotheses concerning the Moon's origin be tested
    (D) argue that the Moon could not have been formed out of the typical planet-forming materials of the presolar nebula
    (E) describe one reason why the Moon's geochemical makeup should resemble that of the Earth

18. According to the passage, Mars and the Earth are similar in which of the following ways?
    I. Their satellites were formed by collisions with other celestial bodies.
    II. Their cores contain iron.
    III. They were formed from the presolar nebula.
    (A) III only
    (B) I and II only
    (C) I and III only
    (D) II and III only
    (E) I, II, and III

19. The author implies that a nearly circular orbit is unlikely for a satellite that
    (A) circles one of the inner planets
    (B) is deficient in iron
    (C) is different from its planet geochemically
    (D) was formed by a collision between two celestial bodies
    (E) was formed out of the planet-forming materials in the presolar nebula

20. Which of the following, if true, would be most likely to make it difficult to verify the collision hypothesis in the manner suggested by the author?
    (A) The Moon's core and mantlerock are almost inactive geologically.
    (B) The mantlerock of the Earth has changed in composition since the formation of the Moon, while the mantlerock of the Moon has remained chemically inert.
    (C) Much of the Earth's iron fell to the Earth's core long before the formation of the Moon, after which the Earth's mantlerock remained unchanged.
    (D) Certain of the Earth's elements, such as platinum, gold, and iridium, followed iron to the Earth's core.
    (E) The mantlerock of the Moon contains elements such as platinum, gold, and iridium.

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Surprisingly enough, modern historians have rarely interested themselves in the history of the American South in the period before the South began to become self-consciously and distinctively "Southern"—the decades after 1815. Consequently, the cultural history of Britain's North American empire in the seventeenth and eighteenth centuries has been written almost as if the Southern colonies had never existed. The American culture that emerged during the Colonial and Revolutionary eras has been depicted as having been simply an extension of New England Puritan culture. However, Professor Davis has recently argued that the South stood apart from the rest of American society during this early period, following its own unique pattern of cultural development. The case for Southern distinctiveness rests upon two related premises: first, that the cultural similarities among the five Southern colonies were far more impressive than the differences, and second, that what made those colonies alike also made them different from the other colonies. The first, for which Davis offers an enormous amount of evidence, can be accepted without major reservations; the second is far more problematic.

What makes the second premise problematic is the use of the Puritan colonies as a basis for comparison. Quite properly, Davis decries the excessive influence ascribed by historians to the Puritans in the formation of American culture. Yet Davis inadvertently adds weight to such ascriptions by using the Puritans as the standard against which to assess the achievements and contributions of Southern colonials. Throughout, Davis focuses on the important, and undeniable, differences between the Southern and Puritan colonies in motives for and patterns of early settlement, in attitudes toward nature and Native Americans, and in the degree of receptivity to metropolitan cultural influences.

However, recent scholarship has strongly suggested that those aspects of early New England culture that seem to have been most distinctly Puritan, such as the strong religious orientation and the communal impulse, were not even typical of New England as a whole, but were largely confined to the two colonies of Massachusetts and Connecticut. Thus, what in contrast to the Puritan colonies appears to Davis to be peculiarly Southern—acquisitiveness, a strong interest in politics and the law, and a tendency to cultivate metropolitan cultural models—was not only more typically English than the cultural patterns exhibited by Puritan Massachusetts and Connecticut, but also almost certainly characteristic of most other early modern British colonies from Barbados north to Rhode Island and New Hampshire. Within the larger framework of American colonial life, then, not the Southern but the Puritan colonies appear to have been distinctive, and even they seem to have been rapidly assimilating to the dominant cultural patterns by the late Colonial period.

21. The author is primarily concerned with

(A) refuting a claim about the influence of Puritan culture on the early American South
(B) refuting a thesis about the distinctiveness of the culture of the early American South
(C) refuting the two premises that underlie Davis' discussion of the culture of the American South in the period before 1815
(D) challenging the hypothesis that early American culture was homogeneous in nature
(E) challenging the contention that the American South made greater contributions to early American culture than Puritan New England did

22. The passage implies that the attitudes toward Native Americans that prevailed in the Southern colonies

(A) were in conflict with the cosmopolitan outlook of the South
(B) derived from Southerners' strong interest in the law
(C) were modeled after those that prevailed in the North
(D) differed from those that prevailed in the Puritan colonies
(E) developed as a response to attitudes that prevailed in Massachusetts and Connecticut

23. According to the author, the depiction of American culture during the Colonial and Revolutionary eras as an extension of New England Puritan culture reflects the

(A) fact that historians have overestimated the importance of the Puritans in the development of American culture
(B) fact that early American culture was deeply influenced by the strong religious orientation of the colonists
(C) failure to recognize important and undeniable cultural differences between New Hampshire and Rhode Island on the one hand and the Southern colonies on the other
(D) extent to which Massachusetts and Connecticut served as cultural models for the other American colonies
(E) extent to which colonial America resisted assimilating cultural patterns that were typically English

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24. The author of the passage is in agreement with which of the following elements of Davis' book?

I. Davis' claim that acquisitiveness was a characteristic unique to the South during the Colonial period
II. Davis' argument that there were significant differences between Puritan and Southern culture during the Colonial period
III. Davis' thesis that the Southern colonies shared a common culture

(A) I only
(B) II only
(C) III only
(D) I and II only
(E) II and III only

25. It can be inferred from the passage that the author would find Davis' second premise (lines 18-20) more plausible if it were true that

(A) Puritan culture had displayed the tendency characteristic of the South to cultivate metropolitan cultural models
(B) Puritan culture had been dominant in all the non-Southern colonies during the seventeenth and eighteenth centuries
(C) the communal impulse and a strong religious orientation had been more prevalent in the South
(D) the various cultural patterns of the Southern colonies had more closely resembled each other
(E) the cultural patterns characteristic of most early modern British colonies had also been characteristic of the Puritan colonies

26. The passage suggests that by the late Colonial period the tendency to cultivate metropolitan cultural models was a cultural pattern that was

(A) dying out as Puritan influence began to grow
(B) self-consciously and distinctively Southern
(C) spreading to Massachusetts and Connecticut
(D) more characteristic of the Southern colonies than of England
(E) beginning to spread to Rhode Island and New Hampshire

27. Which of the following statements could most logically follow the last sentence of the passage?

(A) Thus, had more attention been paid to the evidence, Davis would not have been tempted to argue that the culture of the South diverged greatly from Puritan culture in the seventeenth century.
(B) Thus, convergence, not divergence, seems to have characterized the cultural development of the American colonies in the eighteenth century.
(C) Thus, without the cultural diversity represented by the American South, the culture of colonial America would certainly have been homogeneous in nature.
(D) Thus, the contribution of Southern colonials to American culture was certainly overshadowed by that of the Puritans.
(E) Thus, the culture of America during the Colonial period was far more sensitive to outside influences than historians are accustomed to acknowledge.

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Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. HARMONY: (A) dishonesty (B) indignity (C) insecurity (D) discord (E) irritation

29. SLACK: (A) twisted (B) taut (C) compact (D) durable (E) shattered

30. JOCULAR: (A) active (B) serious (C) unknown (D) equable (E) destructive

31. IMPEDE: (A) assist (B) entreat (C) dislodge (D) ascribe (E) avow

32. SAP: (A) fortify (B) alleviate (C) lend credence (D) hold fast (E) draw out

33. CONTROL:
(A) minor variable
(B) weak assumption
(C) improper simulation
(D) group experimented on
(E) expression substituted for

34. RECONDITE: (A) intended (B) defeated (C) widely understood (D) freely dispensed (E) recently discovered

35. INIMITABLE: (A) inclined to disagree (B) unwilling to compete (C) eager to advise (D) intelligible (E) ordinary

36. DISINTER: (A) restrain (B) confiscate (C) resist (D) bury (E) fund

37. DIATRIBE:
(A) laudatory piece of writing
(B) formal speech by one person
(C) written agreement
(D) farewell address
(E) witty poem

38. HOODWINK: (A) explain (B) shock (C) lead (D) disregard (E) disabuse

SECTION 4

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-5

A college president wishes to select four members of a faculty-student committee as representatives to meet with the college's board of trustees. The faculty-student committee consists of exactly four faculty members—F, G, H, and I—and four students—R, S, T, and U. The president can select any of the committee members as representatives as long as she observes the following restrictions:

The group of four representatives must consist of exactly two faculty members and two students.
Either F or G must be one of the representatives, but F and G cannot both be representatives.
If R is a representative, H must also be a representative.
If T is a representative, G cannot be a representative.

1. If R is a representative, which of the following CANNOT also be a representative?

(A) H
(B) I
(C) S
(D) T
(E) U

2. If neither S nor U is a representative, which of the following is the pair of faculty members who must be representatives?

(A) F and G
(B) F and H
(C) F and I
(D) G and H
(E) G and I

3. If G is a representative, which of the following can be the other three representatives?

(A) F, S, U
(B) H, I, R
(C) H, R, S
(D) H, S, T
(E) I, R, U

4. If G, I, and S are representatives, which of the following must also be a representative?

(A) F
(B) H
(C) R
(D) T
(E) U

5. If T is a representative and H is not a representative, the group of representatives would be completely determined if it were also true that

(A) F is a representative
(B) I is a representative
(C) G is not a representative
(D) R is not a representative
(E) U is not a representative

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6. Injections of small quantities of a drug, the active ingredient of which is a human hormone, have been shown to reverse very high blood pressure rapidly and without causing undesirable side effects. However, high blood pressure is a condition that must be treated for a patient's entire lifetime, and because the frequency of injections that would be necessary renders the drug unsatisfactory for such long-term treatment, doctors continue to treat patients with injections of other medications.

   Which of the following can be properly concluded from the statements above?

   (A) The beneficial effects of the drug in the doses in which it is administered are short-lived compared to the effects of some other injected medications.
   (B) Less-frequent injections of the drug in larger doses would provide a satisfactory treatment for very high blood pressure.
   (C) The human body can be stimulated to produce the hormone whenever blood pressure reaches dangerously high levels.
   (D) When the drug is administered orally rather than by injection, it reverses very high blood pressure but also causes undesirable side effects.
   (E) Drugs that are administered orally can reverse very high blood pressure even more rapidly than can drugs taken by injection.

7. The neurons in the human brain have a unique property: they are cells that, in adults, do not divide. This property makes them immune from cancer. If the mechanism that keeps neurons from proliferating can be found and transferred to other types of cells, the complete prevention of the cancers afflicting those cells will be possible.

   Which of the following, if true, would provide a good reason for not trying to prevent cancer by the method indicated above?

   (A) The human brain contains cell types other than neurons.
   (B) The process of normal cell division has been studied extensively and is well understood.
   (C) Most human tissue depends on the periodic division of cells for its health.
   (D) The mechanism that keeps neurons from proliferating in adults has never been known to fail.
   (E) Some kinds of cancer whose causes are known can be prevented now, but there are few kinds for which it is practically feasible to eliminate the causes.

8. Twenty percent of all energy consumed in the United States is consumed by home appliances. If appliances that are twice as energy-efficient as those currently available are produced, this figure will eventually be reduced to about ten percent.

   The argument above requires which of the following assumptions?

   (A) Home-appliance usage would not increase along with the energy efficiency of the appliances.
   (B) It would not be expensive to produce home appliances that are energy-efficient.
   (C) Home-appliance manufacturers now have the technology to produce appliances that are twice as energy-efficient as those currently available.
   (D) The cost of energy to the consumer would rise with increases in the energy efficiency of home appliances.
   (E) The percentage of energy consumed by home appliances will increase if existing appliances are not replaced by more energy-efficient models.

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Questions 9 -14

A selection from six colored lights—M, O, P, R, T, and Y—is projected onto a wall, one light at a time, in a continuous sequence that lasts exactly 30 seconds. A single projection of a light lasts exactly six seconds. A single projection of a light can be followed immediately by another projection of the same light. A color cannot be projected any more than three times in any thirty-second sequence. Any sequence is organized according to the following conditions:

No time elapses between the end of one six-second projection and the beginning of another.
R cannot be projected in any sequence more than once.
If R is the first color projected in a sequence, Y cannot be projected in that sequence.
If P is projected at least once after T in a sequence, P is projected exactly twice in that sequence.
M is projected for the last six seconds in every sequence

9. Which of the following is an acceptable sequence?

(A) M, O, R, R, M
(B) R, O, P, T, M
(C) R, O, T, P, M
(D) T, M, M, M, M
(E) Y, R, O, R, P

10. Which of the following must be true of any thirty-second sequence that is made up of exactly two colors?

(A) R is not projected.
(B) Y is not projected.
(C) O is projected.
(D) P is projected.
(E) T is projected.

11. P can occupy 18 seconds of a sequence if the sequence begins with any of the following colors EXCEPT

(A) M
(B) O
(C) R
(D) T
(E) Y

12. If R is the first color projected and O is the second color projected in a sequence that contains the maximum number of colors, the third and fourth colors projected must be

(A) M and then Y
(B) T and then Y
(C) T and then P
(D) P and then T
(E) P and then M

13. If a sequence begins with 12 seconds of Y, any of the following could be projected in the next 12 seconds EXCEPT

(A) 12 seconds of M
(B) 6 seconds of O, followed by 6 seconds of R
(C) 6 seconds of R, followed by 6 seconds of M
(D) 6 seconds of T, followed by 6 seconds of P
(E) 6 seconds of Y, followed by 6 seconds of P

14. If the first three lights projected in a sequence are O, R, and T, in that order, which of the following must be true of that sequence?

(A) P is not projected.
(B) Y is not projected.
(C) M is projected exactly once.
(D) Exactly four different colors make up the sequence.
(E) Exactly five different colors make up the sequence.

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Questions 15-18

A large office complex has exactly seven buildings—R, S, T, U, V, W, and X. A delivery service with four vans—van 1, van 2, van 3, and van 4—carries packages by van from building to building at the complex. Each van has a unique route, which it repeats throughout the day:

Van 1 travels only from R to S, from S to T, from T to U, from U to V, and from V to R.
Van 2 travels only from S to W and back to S.
Van 3 travels only from T to V and back to T.
Van 4 travels only from U to X and back to U.

Vans stop at each building to which they travel, and packages can be picked up or delivered at any stop. Any van can also leave a package for any other van to pick up at any building where both vans stop.

15. A package sent by van can be delivered with no intermediate stops if it is sent from

(A) R to W
(B) S to R
(C) T to R
(D) U to T
(E) V to T

16. On its way to any building in the complex, a package sent by van from W must travel to

(A) R
(B) S
(C) T
(D) U
(E) V

17. What is the minimum number of intermediate stops for a package sent by van from R to V?

(A) One
(B) Two
(C) Three
(D) Four
(E) Six

18. Which of the following lists all of the vans, in the order of use, that would be needed to send a package by van from X to T with the minimum number of intermediate stops?

(A) Van 3, van 1
(B) Van 4, van 1
(C) Van 1, van 2, van 3
(D) Van 2, van 1, van 4
(E) Van 4, van 1, van 3

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Questions 19-22

A house inspection company must inspect each of seven houses—F, G, H, J, K, L, and M. The company will use two inspectors, each of whom will be assigned a group of houses to inspect. The houses will be divided into group 1 and group 2 according to the following conditions:

Each group must include at least three houses.
No house can be in both groups.
F must be in the same group as M.
If H is in group 1, L must be in group 1.
If J is in group 2, G must be in group 1.

19. Which of the following is an acceptable assignment of houses to groups?

	Group 1	Group 2
(A)	F, H, J, L	G, K, M
(B)	F, H, L, M	G, J, K
(C)	G, H, K, L	F, J, M
(D)	G, K, L, M	F, H, J
(E)	H, K, L	F, G, J, M

20. If G and L are in group 2, which of the following must be together in one of the groups?

(A) F and H
(B) F and K
(C) H and J
(D) H and K
(E) J and M

21. Any of the following could be true EXCEPT:

(A) F and H are in group 2.
(B) G and J are in group 1.
(C) L and M are in group 1.
(D) F, K, and L are in group 1.
(E) J, K, and H are in group 2.

22. If F is in group 2 with only two other houses, which of the following must be in group 1 ?

(A) G
(B) H
(C) J
(D) K
(E) L

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23. When a large bird, the dodo, still inhabited the island of Mauritius, one of its favorite foods was the fruit of a particular species of tree. After the dodo became extinct, new fruit trees of that species ceased to sprout on the island.

Which of the following, if true, would most help to account for the phenomenon described above?

(A) The dodo ate a variety of other fruits as well; trees producing these other fruits continued to flourish after the dodo's extinction.
(B) Although other birds also ate the tree's fruit, the dodo was the largest and thus required the greatest quantities of fruit.
(C) When the fruit of the tree was not eaten, it gradually decayed, and the seeds within the fruit were deposited in soil.
(D) The dodo's digestive processes softened the seeds of the tree's fruit before the dodo excreted the seeds; the seeds germinated only after being thus softened.
(E) The dodo tended to live where the tree's fruit was plentiful; it was in these areas that new fruit trees of that species sprouted before the dodo's extinction.

Questions 24-25

Mercury, one of the deadliest toxins, makes up approximately fifty percent of the amalgam used by dentists in silver fillings. The effects of acute mercury poisoning are well known—kidney failure, muscle tremors, memory loss, and even death. It is clear that responsible dentists should remove all of their patients' silver fillings and replace them with fillings of plastic composites.

24. Which of the following, if true, most seriously weakens the author's argument?

(A) Plastic composite fillings are more expensive than silver fillings.
(B) Most patients are satisfied with the durability of their silver fillings.
(C) A patient's exposure to mercury from multiple silver fillings is at a harmless level.
(D) Most dental insurance plans do not consider the replacing of silver fillings to be necessary.
(E) Mercury is also present in certain seafoods, alcoholic beverages, and medications.

25. Which of the following, if true, most strengthens the author's argument?

(A) Silver fillings gradually corrode and small amounts of mercury leak from the amalgam.
(B) It is difficult to measure the amount of mercury in a person's body.
(C) Some patients have more than one filling per tooth.
(D) Mercury poisoning produces a range of subtle but distinctive symptoms.
(E) The materials for plastic composite fillings are readily available to dentists.

SECTION 5

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

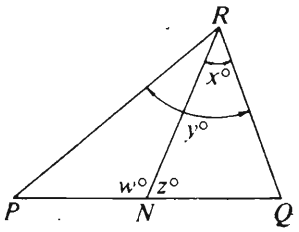
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

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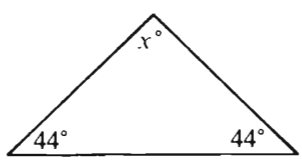
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	The number of seconds in an hour	The number of days in 10 years
2.	The average (arithmetic mean) of 13, 31, and 81	The average (arithmetic mean) of 13, 30, and 81
	$x = 4$	
3.	$3x^2$	144
		
4.	x	88
5.	$(598.95)^2$	360,000
6.	3.4(5.5)	3(5.5) + 0.4(5.5)
7.	The cost of x apples at a cost of $y + 2$ cents apiece	The cost of y oranges at a cost of $x + 2$ cents apiece
8.	$\sqrt{5^2}$	$5\sqrt{5}$

	Column A	Column B
	A rectangular box is 2 feet wide and 3 feet long and has a volume of 15 cubic feet.	
9.	The height of the box	3 feet
10.	24 percent of 75	75 percent of 24
	The height of right circular cylinder C is 3 times the diameter of its base.	
11.	The circumference of the base of C	The height of C
12.	The area of a square region with perimeter 24	The area of a rectangular region with perimeter 28
	$2x + 3y = 10$ $x + 2y = 8$	
13.	$x + y$	2
	In the rectangular coordinate plane, points P, Q, and R have coordinates (2, 3), (5, 6), and (5, 3), respectively.	
14.	PQ	QR
	x is an integer greater than 1.	
15.	3^{x+1}	4^x

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Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. If $n + n = k + k + k$ and $n + k = 5$, then $n =$

(A) 2
(B) 3
(C) 5
(D) 6
(E) 9

17. What is the length of a rectangle that has width 10 and perimeter 60 ?

(A) 15
(B) 20
(C) 25
(D) 30
(E) 40

18. A watch gains 7 minutes and 6 seconds every 6 days. If the rate of gain is constant, how much does the watch gain in one day?

(A) 1 min 1 sec
(B) 1 min 6 sec
(C) 1 min 11 sec
(D) 1 min 16 sec
(E) 1 min 21 sec

19. If $2x = 7$ and $3y = 2$, then $9xy =$

(A) 14
(B) 18
(C) 21
(D) 28
(E) 63

20. If $\sqrt{x} = 16$, then $x =$

(A) 4
(B) 8
(C) 16
(D) 32
(E) 256

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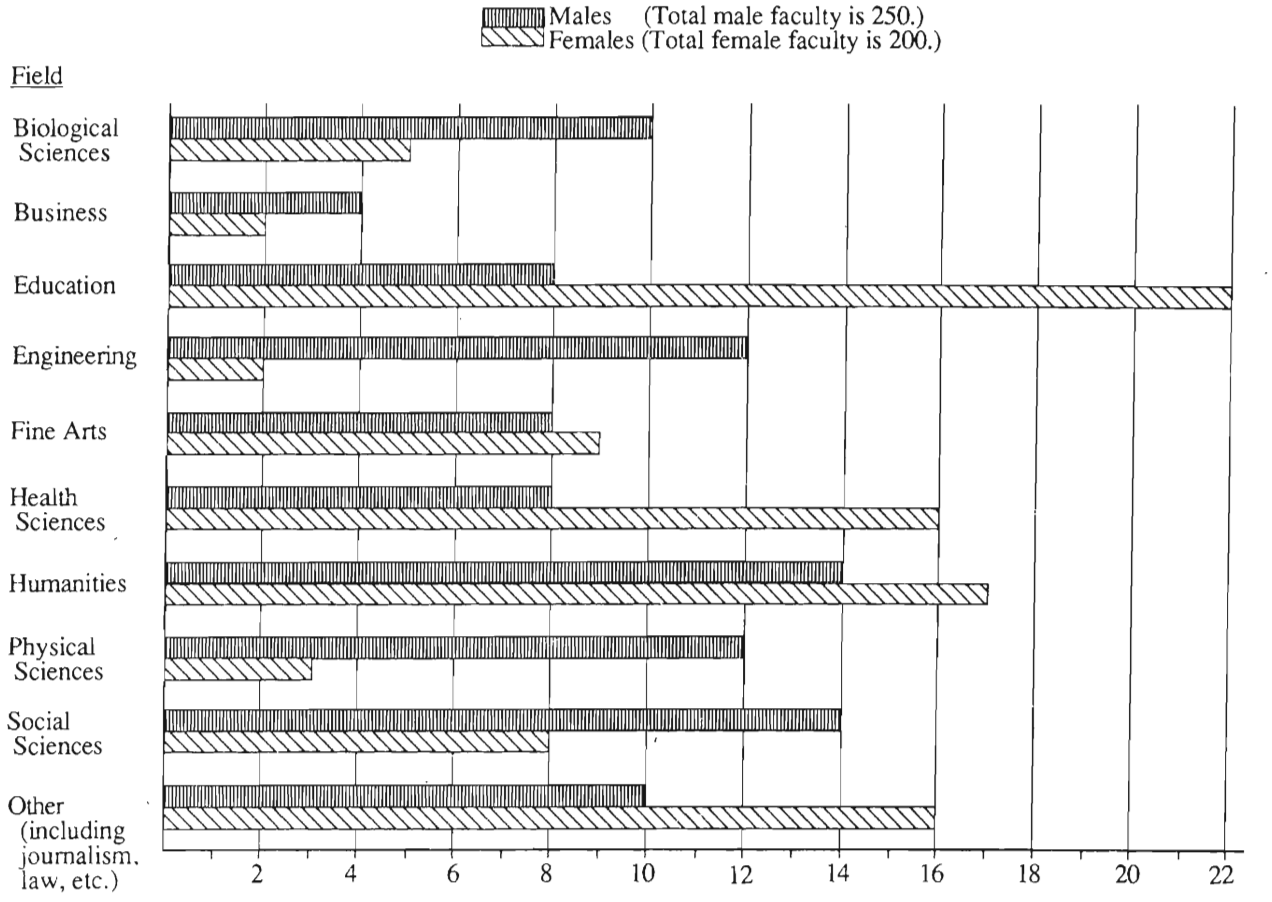
Questions 21-25 refer to the following graph.

PERCENT OF TOTAL MALE FACULTY AND PERCENT OF TOTAL FEMALE FACULTY AT UNIVERSITY *X* BY FIELD



Note: Drawn to scale.

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21. For how many of the fields is the percent of total male faculty at University X greater than 11 percent?

(A) Two
(B) Three
(C) Four
(D) Five
(E) Six

22. How many female faculty members are there in fine arts?

(A) 14
(B) 16
(C) 17
(D) 18
(E) 20

23. If the number of female faculty members in social sciences were to increase by 75 percent, how many female faculty members would there be in social sciences?

(A) 12
(B) 14
(C) 21
(D) 28
(E) 30

24. If there are 275 students in engineering at University X, what is the approximate ratio of the number of engineering students to the number of engineering faculty?

(A) 8 to 1
(B) 12 to 1
(C) 14 to 1
(D) 18 to 1
(E) 20 to 1

25. Approximately what percent of the humanities faculty is male?

(A) 35%
(B) 38%
(C) 41%
(D) 45%
(E) 51%

GO ON TO THE NEXT PAGE.

26. If $2r - s = 3s - 2r$, what is s in terms of r?

(A) $\frac{r}{3}$

(B) $\frac{r}{2}$

(C) r

(D) $2r$

(E) $3r$

27. If $n \neq 0$, which of the following must be greater than n?

I. $2n$
II. n^3
III. $4 - n$

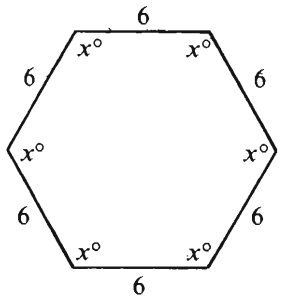
(A) None
(B) I only
(C) II only
(D) I and II
(E) I and III

28. The distance from point X to point Y is 20 miles, and the distance from point X to point Z is 12 miles. If d is the distance, in miles, between points Y and Z, then the range of possible values for d is indicated by

(A) $8 \leqq d \leqq 20$
(B) $8 \leqq d \leqq 32$
(C) $12 \leqq d \leqq 20$
(D) $12 \leqq d \leqq 32$
(E) $20 \leqq d \leqq 32$

29. What is the least integer value of n such that $\frac{1}{2^n} < 0.01$?

(A) 7
(B) 11
(C) 50
(D) 51
(E) There is no such least value.



30. What is the area of the hexagonal region shown in the figure above?

(A) $54\sqrt{3}$
(B) 108
(C) $108\sqrt{3}$
(D) 216
(E) It cannot be determined from the information given.

SECTION 6

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. The functions of the hands, eyes, and brain are so ------- that using the hands during early childhood helps to promote the child's entire ------- development.

   (A) intertwined. .perceptual
   (B) unalterable. .intellectual
   (C) enigmatic. .psychological
   (D) regulated. .adolescent
   (E) individualized. .social

2. Before 1500 North America was inhabited by more than 300 cultural groups, each with different customs, social structures, world views, and languages; such diversity -------- the existence of a single Native American culture.

   (A) complements (B) implies (C) reiterates (D) argues against (E) explains away

3. That dealers ------- enough to nurture a young modern painter's career rather than plunder it exist is not impossible, but the public's ------- appetite for modern art makes such dealers less and less likely.

   (A) chivalrous. .discriminating
   (B) magnanimous. .quirky
   (C) patient. .insatiable
   (D) cynical. .finicky
   (E) reckless. .zealous

4. In the absence of any ------- caused by danger, hardship, or even cultural difference, most utopian communities deteriorate into ------- but enervating backwaters.

   (A) turmoil. .frantic
   (B) mistrust. .naïve
   (C) amelioration. .ignorant
   (D) decimation. .intrusive
   (E) stimulation. .placid

5. As Juanita argued, this new code of conduct is laughable; its principles are either -------, offering no wisdom but the obvious, or are so devoid of specific advice as to make almost any action -------.

   (A) irresolute. .unlikely
   (B) corroborative. .redundant
   (C) platitudinous. .justifiable
   (D) homogeneous. .impartial
   (E) labyrinthine. .unacceptable

6. Histocompatibility antigens that attack foreign tissue in the body cannot have been ------- through evolution expressly to ------- organ transplantation; on the contrary, they have been found to facilitate many essential biological functions.

   (A) designed. .retain
   (B) produced. .aid
   (C) developed. .enhance
   (D) selected. .promote
   (E) conserved. .foil

7. Their air of cheerful self-sacrifice and endless complaisance won them undeserved praise, for their seeming gallantry was wholly motivated by a ------- wish to avoid conflict of any sort.

   (A) poignant
   (B) sincere
   (C) plaintive
   (D) laudable
   (E) craven

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. RUST : CORROSION ::
   (A) vapor : flammability
   (B) dew : condensation
   (C) crystal : purification
   (D) solution : precipitation
   (E) mold : disinfection

9. CLAIM : LEGITIMATED ::
   (A) hypothesis : confirmed
   (B) verdict : appealed
   (C) counterargument : doubted
   (D) proposition : repeated
   (E) speculation : disbelieved

10. ENCLOSE : PARENTHESES ::
    (A) abbreviate : brackets
    (B) emphasize : hyphen
    (C) separate : comma
    (D) join : period
    (E) omit : colon

11. ANTENNA : SIGNAL :: (A) bread : grain
    (B) story : reporter (C) stem : flower
    (D) net : fish (E) telegram : sender

12. WAG : HUMOROUS ::
    (A) ruffian : frightened
    (B) spendthrift : inattentive
    (C) dolt : stupid
    (D) pirate : merciless
    (E) sinner : repentant

13. FIRM : IRONCLAD :: (A) bruised : broken
    (B) polished : shining (C) smart : brilliant
    (D) hard : stiff (E) jovial : merry

14. FOIL : METAL :: (A) pebble : concrete
    (B) suede : leather (C) glaze : pottery
    (D) veneer : wood (E) paper : cardboard

15. LEAVE : ABSCOND :: (A) take : steal
    (B) evacuate : flee (C) interest : astound
    (D) build : renovate (E) evaluate : downgrade

16. QUAFF : SIP :: (A) bolt : run (B) punch : hit
    (C) gnaw : nibble (D) trudge : plod
    (E) stride : mince

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

For some time scientists have believed that cholesterol plays a major role in heart disease because people with familial hypercholesterolemia, a genetic defect, have six to eight times the normal level of cholesterol in their blood and they invariably develop heart disease. These people lack cell-surface receptors for low-density lipoproteins (LDL's), which are the fundamental carriers of blood cholesterol to the body cells that use cholesterol. Without an adequate number of cell-surface receptors to remove LDL's from the blood, the cholesterol-carrying LDL's remain in the blood, increasing blood cholesterol levels. Scientists also noticed that people with familial hypercholesterolemia appear to produce more LDL's than normal individuals. How, scientists wondered, could a genetic mutation that causes a slowdown in the removal of LDL's from the blood also result in an increase in the synthesis of this cholesterol-carrying protein?

Since scientists could not experiment on human body tissue, their knowledge of familial hypercholesterolemia was severely limited. However, a breakthrough came in the laboratories of Yoshio Watanabe of Kobe University in Japan in 1980. Watanabe noticed that a male rabbit in his colony had ten times the normal concentration of cholesterol in its blood. By appropriate breeding, Watanabe obtained a strain of rabbits that had very high cholesterol levels. These rabbits spontaneously developed heart disease. To his surprise, Watanabe further found that the rabbits, like humans with familial hypercholesterolemia, lacked LDL receptors. Thus, scientists could study these Watanabe rabbits to gain a better understanding of familial hypercholesterolemia in humans.

Prior to the breakthrough at Kobe University, it was known that LDL's are secreted from the liver in the form of a precursor, called very low-density lipoproteins (VLDL's), which carry triglycerides as well as relatively small amounts of cholesterol. The triglycerides are removed from the VLDL's by fatty and other tissues. What remains is a remnant particle that must be removed from the blood. What scientists learned by studying the Watanabe rabbits is that the removal of the VLDL remnant requires the LDL receptor. Normally, the majority of the VLDL remnants go to the liver where they bind to LDL receptors and are degraded. In the Watanabe rabbit, due to a lack of LDL receptors on liver cells, the VLDL remnants remain in the blood and are eventually converted to LDL's. The LDL receptors thus have a dual effect in controlling LDL levels. They are necessary to prevent oversynthesis of LDL's from VLDL remnants and they are necessary for the normal removal of LDL's from the blood. With this knowledge, scientists are now well on the way toward developing drugs that dramatically lower cholesterol levels in people afflicted with certain forms of familial hypercholesterolemia.

17. In the passage, the author is primarily concerned with
    (A) presenting a hypothesis and describing compelling evidence in support of it
    (B) raising a question and describing an important discovery that led to an answer
    (C) showing that a certain genetically caused disease can be treated effectively with drugs
    (D) explaining what causes the genetic mutation that leads to heart disease
    (E) discussing the importance of research on animals for the study of human disease

18. Which of the following drugs, if developed, would most likely be an example of the kind of drug mentioned in line 53 ?
    (A) A drug that stimulates the production of VLDL remnants
    (B) A drug that stimulates the production of LDL receptors on the liver
    (C) A drug that stimulates the production of an enzyme needed for cholesterol production
    (D) A drug that suppresses the production of body cells that use cholesterol
    (E) A drug that prevents triglycerides from attaching to VLDL's

19. The passage supplies information to answer which of the following questions?
    (A) Which body cells are the primary users of cholesterol?
    (B) How did scientists discover that LDL's are secreted from the liver in the form of a precursor?
    (C) Where in the body are VLDL remnants degraded?
    (D) Which body tissues produce triglycerides?
    (E) What techniques are used to determine the presence or absence of cell-surface receptors?

GO ON TO THE NEXT PAGE.

20. According to the passage, by studying the Watanabe rabbits scientists learned that

(A) VLDL remnants are removed from the blood by LDL receptors in the liver
(B) LDL's are secreted from the liver in the form of precursors called VLDL's
(C) VLDL remnant particles contain small amounts of cholesterol
(D) triglycerides are removed from VLDL's by fatty tissues
(E) LDL receptors remove LDL's from the blood

21. The development of drug treatments for some forms of familial hypercholesterolemia is regarded by the author as

(A) possible, but not very important
(B) interesting, but too costly to be practical
(C) promising, but many years off
(D) extremely unlikely
(E) highly probable

22. The passage implies that if the Watanabe rabbits had had as many LDL receptors on their livers as do normal rabbits, the Watanabe rabbits would have been

(A) less likely than normal rabbits to develop heart disease
(B) less likely than normal rabbits to develop high concentrations of cholesterol in their blood
(C) less useful than they actually were to scientists in the study of familial hypercholesterolemia in humans
(D) unable to secrete VLDL's from their livers
(E) immune to drugs that lower cholesterol levels in people with certain forms of familial hypercholesterolemia

23. The passage implies that Watanabe rabbits differ from normal rabbits in which of the following ways?

(A) Watanabe rabbits have more LDL receptors than do normal rabbits.
(B) The blood of Watanabe rabbits contains more VLDL remnants than does the blood of normal rabbits.
(C) Watanabe rabbits have fewer fatty tissues than do normal rabbits.
(D) Watanabe rabbits secrete lower levels of VLDL's than do normal rabbits.
(E) The blood of Watanabe rabbits contains fewer LDL's than does the blood of normal rabbits.

GO ON TO THE NEXT PAGE.

(The article from which this passage was taken appeared in 1981.)

When speaking of Romare Bearden, one is tempted to say, "A great Black American artist." The subject matter of Bearden's collages is certainly Black. Portrayals of the folk of Mecklenburg County, North Carolina, whom he remembers from early childhood, of the jazz musicians and tenement roofs of his Harlem days, of Pittsburgh steelworkers, and his reconstruction of classical Greek myths in the guise of the ancient Black kingdom of Benin, attest to this. In natural harmony with this choice of subject matter are the social sensibilities of the artist, who remains active today with the Cinque Gallery in Manhattan, which he helped found and which is devoted to showing the work of minority artists.

Then why not call Bearden a Black American artist? Because ultimately this categorization is too narrow. "What stands up in the end is structure," Bearden says. "What I try to do is amplify. If I were just creating a picture of a farm woman from back home, it would have meaning to her and people there. But art amplifies itself to something universal."

24. According to the passage, all of the following are depicted in Bearden's collages EXCEPT

(A) workers in Pittsburgh's steel mills
(B) scenes set in the ancient kingdom of Benin
(C) people Bearden knew as a child
(D) traditional representations of the classical heroes of Greek mythology
(E) the jazz musicians of the Harlem Bearden used to know

25. The author suggests that Bearden should not be called a Black American artist because

(A) there are many collages by Bearden in which the subject matter is not Black
(B) Bearden's work reflects the Black American experience in a highly individual style
(C) through the structure of Bearden's art his Black subjects come to represent all of humankind
(D) Bearden's true significance lies not so much in his own work as in his efforts to help other minority artists
(E) much of Bearden's work uses the ancient Black kingdom of Benin for its setting

26. Bearden's social sensibilities and the subject matter of his collages are mentioned by the author in order to explain

(A) why one might be tempted to call Bearden a Black American artist
(B) why Bearden cannot be readily categorized
(C) why Bearden's appeal is thought by many to be ultimately universal
(D) how deeply an artist's artistic creations are influenced by the artist's social conscience
(E) what makes Bearden unique among contemporary Black American artists

27. The author of the passage is chiefly concerned with

(A) discussing Bearden's philosophy of art
(B) assessing the significance of the ethnic element in Bearden's work
(C) acknowledging Bearden's success in giving artistic expression to the Black American experience
(D) pointing out Bearden's helpfulness to other minority artists
(E) tracing Bearden's progress toward artistic maturity

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. INSERT: (A) remove (B) improve (C) revise (D) lessen (E) copy

29. BANKRUPTCY: (A) hypocrisy (B) solvency (C) advocacy (D) comparability (E) adversity

30. RELEVANT: (A) immaterial (B) random (C) hidden (D) false (E) inopportune

31. IMPLOSION:
(A) high-frequency pitch
(B) violent chemical reaction
(C) rapid outward movement
(D) complete change in composition
(E) uncontrolled variation in temperature

32. SLAB: (A) nib (B) streak (C) husk (D) sliver (E) shield

33. RAREFY: (A) contract suddenly (B) converge slowly (C) blend thoroughly (D) make denser (E) cool quickly

34. IMPETUOUS: (A) appropriate (B) respectful (C) uninteresting (D) voracious (E) deliberate

35. VITUPERATIVE: (A) suggestive (B) complimentary (C) genuine (D) undirected (E) pessimistic

36. FOMENT: (A) squelch (B) sweeten (C) dilute (D) liberate (E) clear

37. INCHOATE: (A) explicit (B) dependable (C) pragmatic (D) therapeutic (E) enduring

38. TYRO: (A) underling (B) expert (C) eccentric (D) truthful person (E) beneficent ruler

FOR GENERAL TEST 11 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY

Section 3			Section 6		
Number	Answer	P+	Number	Answer	P+
1	A	96	1	A	89
2	C	74	2	D	75
3	C	71	3	C	59
4	C	55	4	E	50
5	D	59	5	C	57
6	E	43	6	E	39
7	A	28	7	E	24
8	B	94	8	B	81
9	D	83	9	A	86
10	C	75	10	C	84
11	D	63	11	D	57
12	E	49	12	C	51
13	E	39	13	C	43
14	E	37	14	D	30
15	E	32	15	A	32
16	C	27	16	E	14
17	A	75	17	B	54
18	D	71	18	B	74
19	D	80	19	C	52
20	B	68	20	A	57
21	B	40	21	E	83
22	D	69	22	C	53
23	A	47	23	B	54
24	E	38	24	D	65
25	B	41	25	C	83
26	C	31	26	A	45
27	B	41	27	B	33
28	D	89	28	A	98
29	B	82	29	B	81
30	B	72	30	A	83
31	A	74	31	C	76
32	A	57	32	D	64
33	D	42	33	D	39
34	C	36	34	E	41
35	E	31	35	B	31
36	D	29	36	A	26
37	A	29	37	A	28
38	E	17	38	B	21

QUANTITATIVE ABILITY

Section 1			Section 5		
Number	Answer	P+	Number	Answer	P+
1	A	90	1	B	88
2	A	83	2	A	85
3	B	88	3	B	85
4	A	83	4	A	81
5	C	84	5	B	80
6	C	68	6	C	77
7	A	83	7	D	77
8	B	71	8	B	77
9	D	70	9	B	67
10	B	76	10	C	64
11	D	52	11	A	48
12	A	64	12	D	41
13	B	74	13	C	46
14	C	33	14	A	60
15	A	32	15	D	20
16	C	86	16	B	77
17	E	76	17	B	84
18	A	78	18	C	72
19	C	63	19	C	74
20	B	62	20	E	80
21	A	76	21	C	90
22	C	68	22	D	83
23	B	59	23	D	65
24	D	64	24	A	68
25	D	64	25	E	44
26	B	53	26	C	64
27	B	45	27	A	54
28	C	37	28	B	47
29	E	20	29	A	37
30	D	19	30	A	21

ANALYTICAL ABILITY

Section 2			Section 4		
Number	Answer	P+	Number	Answer	P+
1	C	75	1	B	56
2	D	54	2	B	78
3	D	59	3	C	78
4	A	82	4	E	86
5	C	71	5	E	41
6	B	76	6	A	79
7	D	73	7	C	78
8	C	80	8	A	68
9	E	54	9	B	76
10	A	72	10	A	57
11	E	86	11	D	66
12	D	10	12	D	47
13	C	62	13	D	42
14	E	60	14	A	37
15	E	28	15	E	67
16	A	51	16	B	89
17	B	42	17	B	29
18	A	27	18	E	51
19	D	33	19	C	73
20	C	62	20	E	32
21	E	22	21	D	25
22	E	21	22	E	10
23	B	56	23	D	69
24	B	61	24	C	75
25	B	46	25	A	66

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 11 ONLY AND THE PERCENTS BELOW*

Raw Score	Verbal Scaled Score	Verbal % Below	Quantitative Scaled Score	Quantitative % Below	Analytical Scaled Score	Analytical % Below
74-76	800	99				
73	800	99				
72	790	99				
71	780	99				
70	770	99				
69	750	98				
68	740	98				
67	730	97				
66	720	96				
65	710	95				
64	700	95				
63	690	94				
62	680	93				
61	670	92				
60	660	90	800	97		
59	650	89	800	97		
58	640	87	800	97		
57	630	85	800	97		
56	620	84	780	94		
55	610	82	760	92		
54	600	80	750	89		
53	590	78	730	86		
52	580	76	720	84		
51	570	74	700	80		
50	560	72	690	78	800	99
49	550	69	670	74	800	99
48	540	67	660	72	800	99
47	520	61	640	68	800	99
46	510	59	630	66	780	98
45	500	56	610	61	770	97
44	490	54	600	59	760	96
43	480	51	590	57	740	95
42	470	48	570	51	720	92
41	460	44	560	49	710	91
40	450	41	550	48	690	88
39	450	41	540	45	680	87
38	440	38	530	42	670	85
37	430	36	520	40	650	81
36	420	33	510	37	630	76
35	410	30	500	35	620	74
34	400	26	490	32	610	72
33	390	24	470	28	590	67
32	390	24	460	26	580	64
31	380	22	450	24	560	58
30	370	20	440	22	550	55
29	360	16	430	20	530	49
28	360	16	420	18	520	46
27	350	14	410	16	500	40
26	340	12	400	14	490	38
25	330	10	390	13	480	35
24	320	9	370	10	460	31
23	310	7	360	9	450	27
22	300	6	350	7	430	23
21	290	5	340	6	420	20
20	280	4	330	5	400	17
19	270	3	320	5	390	15
18	260	2	310	4	370	12
17	250	1	300	3	360	10
16	230	1	290	2	340	7
15	220	1	270	2	330	6
14	200	1	250	1	310	4
13	200	1	240	1	290	3
12	200	1	230	1	280	2
11	200	1	210	1	260	1
10	200	1	200	1	240	1
9	200	1	200	1	230	1
8	200	1	200	1	210	1
7	200	1	200	1	200	1
0-6	200	1	200	1	200	1

*Percent scoring below the scaled score is based on the performance of 923,359 examinees who took the General Test between October 1, 1986, and September 30, 1989. This percent below information is used for score reports during the 1990-91 testing year.

TEST 12

SECTION 1

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

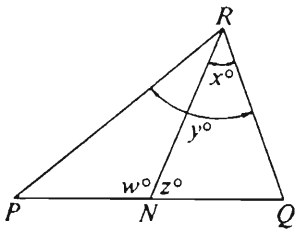
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

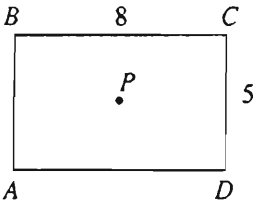
GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	$\frac{1}{15} + \frac{2}{15}$	$\frac{1}{17} + \frac{2}{17}$

A machine packages milk at the rate of q quarts per hour.

2.	The number of hours required for the machine to package 5,000 quarts of milk	8



P is the intersection of the two diagonals of rectangle $ABCD$.

3.	The shortest distance from P to side AB	The length of side AB

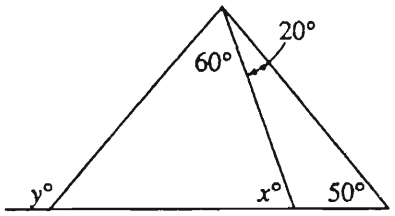
$x < 0 < y$

4.	$x - y$	x

The average (arithmetic mean) of the 4 numbers p, q, r, and s is 7.

5.	$\frac{p + q + r + s}{7}$	4
6.	23.752 × 10,000	23,752

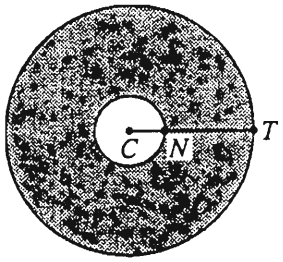
	Column A	Column B



7.	$x + y$	180

$x > z$
$y > z$

8.	$x + y$	z



On the circular target, C is the center of both circles. $CN = 8$ inches and $CT = 30$ inches.

9.	The area of the shaded part of the target	484π sq in

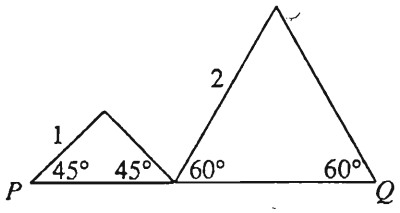
$x = -10$
$\frac{x}{y} = \frac{5}{7}$

10.	x	y

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Column A	Column B

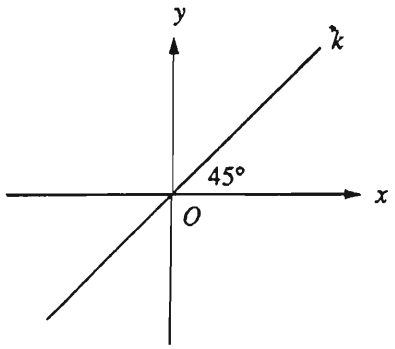


11. The length of PQ | $3\sqrt{2}$

In 1982 the price of one share of Company X stock increased 25 percent from January 1 to February 1 and decreased 20 percent from February 1 to March 1.

12. The price of one share of Company X stock on January 1, 1982 | The price of one share of Company X stock on March 1, 1982

Column A	Column B



The point (not shown) with rectangular coordinates (m, n) is above line k.

13. m | n

---

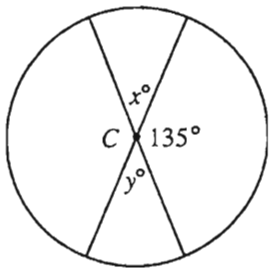
14. $2(\sqrt{50} + 5)$ | $5(2 + 2\sqrt{2})$

---

15. $\frac{x}{10^4}$ | $\frac{x}{10^5}$

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.



16. If C is the center of the circle above, then $x + y =$

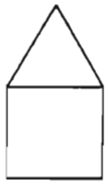
(A) 45
(B) 65
(C) 90
(D) 100
(E) 130

17. If $0.768 = \frac{x}{100}$, then x is closest to which of the following?

(A) 0.77
(B) 0.80
(C) 8
(D) 76
(E) 77

18. If the remainder is 1 when the integer n is divided by 15, what is the remainder when n is divided by 5 ?

(A) 1
(B) 2
(C) 3
(D) 4
(E) It cannot be determined from the information given.



19. In the figure above, the triangle is equilateral, and the area of the square region is 100. What is the perimeter of the triangle?

(A) 10
(B) 30
(C) 50
(D) 60
(E) 75

20. Tom ate $\frac{1}{4}$ of a whole pizza, and Jane ate $\frac{1}{5}$ of the remaining portion. What fraction of the pizza was not eaten?

(A) $\frac{11}{20}$

(B) $\frac{9}{20}$

(C) $\frac{3}{20}$

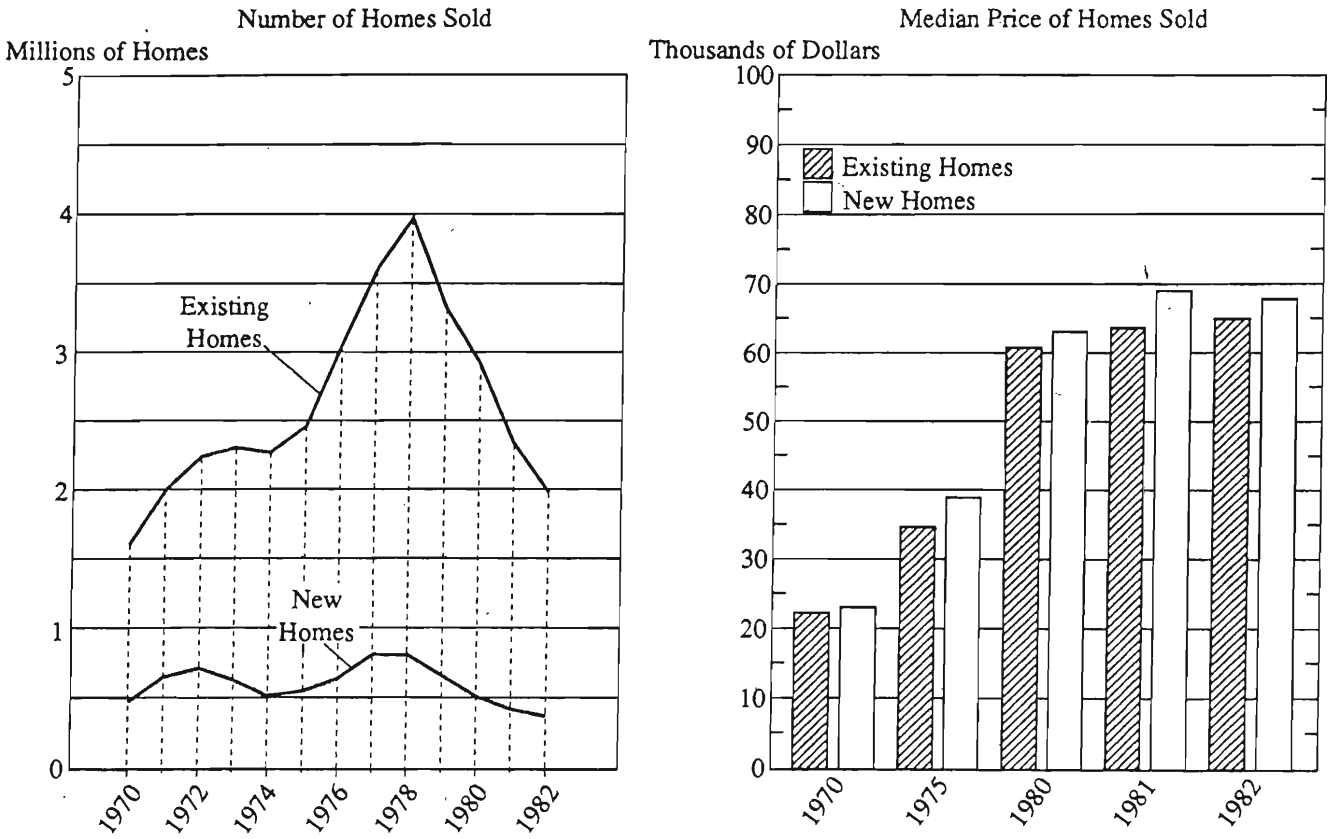
(D) $\frac{3}{5}$

(E) $\frac{2}{5}$

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graphs.

EXISTING AND NEW ONE-FAMILY HOMES* SOLD IN THE UNITED STATES
FROM 1970 TO 1982 AND THE MEDIAN SALE PRICE FOR SELECTED YEARS



*All references to homes in the data and test questions should be interpreted as one-family homes.

Note: Graphs drawn to scale.

21. According to the information in the graph, which of the following could be the actual number of new homes sold in 1980 ?

(A) 49,900
(B) 210,300
(C) 503,400
(D) 750,000
(E) 805,500

22. For which of the following years was there an increase over the previous year in the number of existing homes sold, but a decrease in the number of new homes sold?

(A) 1972
(B) 1973
(C) 1974
(D) 1977
(E) 1979

GO ON TO THE NEXT PAGE.

23. In the year shown in which the median price of existing homes sold was closest to the median price of new homes sold, approximately how many million existing homes were sold?

(A) 1.2
(B) 1.6
(C) 2.0
(D) 2.4
(E) 2.8

24. In 1977 the number of existing homes sold was approximately how many times the number of new homes sold?

(A) 3
(B) 3.5
(C) 4.5
(D) 5.5
(E) 6

25. From 1970 to 1975, the percent increase in the median price of new homes sold was closest to

(A) 15%
(B) 25%
(C) 40%
(D) 50%
(E) 70%

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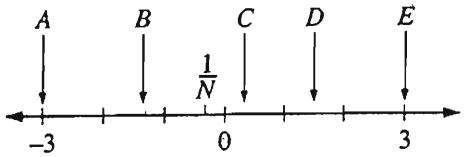
26. If $x = 2$ and $y = -2$, then $2x - 2y =$

(A) -8
(B) 0
(C) 4
(D) 6
(E) 8



Note: Drawn to scale.

27. On the number line above, which arrow could be pointing to N?

(A) A
(B) B
(C) C
(D) D
(E) E

28. This year a city has allotted 60 percent of its budget for school expenditures, and its budget is 15 percent higher than last year's budget of n dollars. In terms of n, how many dollars of this year's budget has the city allotted for school expenditures?

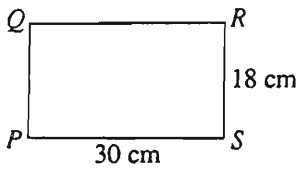
(A) $(0.6)(0.85n)$

(B) $(0.6)(1.15n)$

(C) $\frac{0.6n}{1.15}$

(D) $\frac{0.85n}{0.6}$

(E) $\frac{n}{1.15} + 0.6n$



29. What is the area, in square meters, of rectangular region $PQRS$ above? (1 meter = 100 centimeters)

(A) 0.054 square meter
(B) 0.54 square meter
(C) 5.4 square meters
(D) 54 square meters
(E) 5,400 square meters

30. The integers between 1 and 100, inclusive, are put in list A if they are divisible by 2 and in list B if they are divisible by 3. How many integers in list A are not in list B?

(A) 11
(B) 16
(C) 25
(D) 33
(E) 34

SECTION 2

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-6

In order to solve a burglary that has taken place at the Marshalls' house, Detective Johnson has been instructed to search exactly seven locations—the foyer, the kitchen, the living room, the guest room, the hallway, the music room, and the nursery. The foyer, kitchen, and living room are located downstairs, whereas the guest room, hallway, music room, and nursery are located upstairs. During the first visit to search for evidence, Detective Johnson has time to search exactly three locations. This search must be conducted according to the following conditions:

The three locations searched must be neither all upstairs nor all downstairs.
If the hallway is searched, then the foyer must also be searched.
If the music room is not searched, then the guest room cannot be searched.
The kitchen and the living room cannot both be searched.
The three locations searched must include the living room or the nursery, or both.

1. Which of the following is a selection of locations that conforms to the conditions for Detective Johnson's first visit?

(A) Foyer, guest room, hallway
(B) Foyer, hallway, living room
(C) Foyer, kitchen, living room
(D) Guest room, hallway, kitchen
(E) Guest room, music room, nursery

2. During the first visit, if the kitchen is searched, which of the following must also be searched?

(A) The foyer
(B) The guest room
(C) The hallway
(D) The music room
(E) The nursery

3. During the first visit, if the music room is searched, which of the following is a pair of locations that can both also be searched?

(A) The foyer and the hallway
(B) The guest room and the kitchen
(C) The hallway and the living room
(D) The kitchen and the living room
(E) The kitchen and the nursery

4. During the first visit, if the guest room is searched, which of the following must also be searched?

(A) The foyer
(B) The hallway
(C) The kitchen
(D) The living room
(E) The nursery

5. During the first visit, if the kitchen is the only downstairs location searched, which of the following must also be searched?

(A) The music room and the nursery
(B) The hallway and the nursery
(C) The hallway and the music room
(D) The guest room and the nursery
(E) The guest room and the music room

6. During the first visit, if the living room is not searched, which of the following is a pair of locations that can both be searched?

(A) The foyer and the guest room
(B) The hallway and the kitchen
(C) The foyer and the music room
(D) The hallway and the music room
(E) The guest room and the kitchen

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7. The presence of microorganisms that produce a toxin causes seawater to turn brownish red, a phenomenon known as a red tide. Sea otters do not feed in areas where clams, their main source of food, have become contaminated with this toxin. According to a proposed explanation of the otters' behavior, the otters sample the clams in a potential feeding area and can taste any toxin in them.

   Which of the following, if true, would most strongly indicate that the hypothesis described in the last sentence of the passage is not correct?

   (A) In some of the areas where red tides occur, neither clams nor sea otters are indigenous species.
   (B) The presence of sea otters in a given area has a significant effect on which other marine organisms are to be found in that area.
   (C) When seawater in an area unaffected by red tide is artificially dyed brownish red, sea otters do not feed on the clams in that area.
   (D) If the clams in a given area are contaminated with toxins, sea otters move to other areas in search of food.
   (E) Although very small amounts of the toxin produced during a red tide are not harmful, large doses can be fatal to animals the size of sea otters.

8. An acre of average farmland produces only about 400 pounds of grain amaranth, as against 2,400 pounds per acre, or six times as much, for wheat. It follows that whenever the grain-amaranth price is projected to be more than six times the projected price of wheat, farmers wishing to maximize profits will grow grain amaranth rather than wheat.

   The argument above is based on which of the following assumptions?

   (A) An acre's worth of grain amaranth is no more expensive to grow and bring to market than an acre's worth of wheat.
   (B) There is no crop that produces a higher yield in terms of pounds harvested per acre than wheat.
   (C) By choosing which crops to grow, farmers can exert a significant influence on the prices of those crops.
   (D) Farmers are no less motivated by the desire to maximize profits than are other occupational groups.
   (E) Prices of grain crops can change faster than farmers can change the acreage devoted to various grain crops.

9. Most road repairs require more time and money than is budgeted, but last summer's nighttime repairs of Highway 93 and similar roads required no more time or money than had been budgeted. Therefore, making summer repairs to major roads at night would save both time and money.

   Which of the following, if true, most strongly supports the conclusion drawn above?

   (A) The smaller number of cars on the roads at night and more comfortable nighttime temperatures allow road workers to work more quickly.
   (B) Road repair crews that work at night mark their work sites with bright flashing lights in addition to the orange cones they use during the daytime.
   (C) The budget for the repairs to Highway 93 was generous enough to make it unlikely that it would be exceeded.
   (D) Road workers who are willing to work at night have an easier time finding jobs, since most people would rather work in the daytime.
   (E) Asphalt used in road repair tends to expand in warmer temperatures and contract in cooler temperatures.

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Questions 10-16

Exactly seven children—R, S, T, V, W, X, and Y—are to be divided into two study groups, group 1 and group 2. Group 1 must have three members, and group 2 must have four members. The children are being assigned to groups according to the following conditions:

R cannot be in the same group as T.
If S is in group 1, V must be in group 1.
If W is in group 1, T must be in group 2.
X must be in group 2.

10. Which of the following is an acceptable assignment of the children to the two groups?

	Group 1	Group 2
(A)	R, S, Y	T, V, W, X
(B)	R, T, V	S, W, X, Y
(C)	T, V, X	R, S, W, Y
(D)	T, V, Y	R, S, W, X
(E)	T, W, Y	R, S, V, X

11. If R is in group 2, which of the following must also be in group 2 ?

(A) S
(B) T
(C) V
(D) W
(E) Y

12. If W is in group 1, which of the following must also be in group 1 ?

(A) R
(B) S
(C) T
(D) V
(E) Y

13. If T and Y are both in group 1, which of the following must be true?

(A) S is in the same group as V.
(B) S is in the same group as W.
(C) V is in the same group as R.
(D) W is in the same group as T.
(E) Y is in the same group as X.

14. If W is in the same group as T, any of the following is a pair of children who could be in a group together EXCEPT

(A) R and S
(B) S and Y
(C) T and Y
(D) V and Y
(E) W and X

15. If V is in the same group as Y, which of the following must be true?

(A) R is in group 1.
(B) S is in group 1.
(C) T is in group 1.
(D) W is in group 2.
(E) Y is in group 2.

16. If S is in group 1, which of the following must be true?

(A) R is in group 1.
(B) T is in group 1.
(C) T is in group 2.
(D) Y is in group 1.
(E) Y is in group 2.

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Questions 17-22

A schedule is being prepared for a seminar that will cover exactly seven topics—P, Q, R, S, T, U, and W—one at a time, during a four-day period. Because some topics build upon information presented in other topics, the schedule of topics must comply with the following restrictions:

Each topic must be covered exactly once, and on exactly one day.
No more than three topics are to be covered on any one day.
S must be covered on the second day.
P must be covered on the same day as T.
S must be covered at some time before R is covered and at some time after Q is covered.
R must be covered at some time before P is covered and at some time after U is covered.

17. If exactly one topic is covered on the second day, which of the following topics must be covered on the first day?

(A) P
(B) Q
(C) R
(D) S
(E) T

18. Which of the following is a pair of days, either one of which could be the day on which Q is covered?

(A) The first and the second
(B) The first and the third
(C) The second and the third
(D) The second and the fourth
(E) The third and the fourth

19. Which of the following is a pair of topics that can be covered on the first day?

(A) P and T
(B) R and S
(C) S and U
(D) U and W
(E) W and R

20. If exactly two topics are covered on each of the first three days, which of the following is a pair of topics that must be covered on the third day?

(A) P and T
(B) Q and R
(C) R and U
(D) S and W
(E) W and T

21. If topics R and T are covered on the fourth day, which of the following is a pair of topics that can be covered on the third day?

(A) P and S
(B) P and W
(C) Q and S
(D) Q and U
(E) U and W

22. If topic P is covered on the third day, and exactly one topic is covered on the fourth day, which of the following must be the topic covered on the fourth day?

(A) Q
(B) S
(C) T
(D) U
(E) W

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23. If oven cleaner is added to household bleach, the mixture emits chlorine gas. A mixture of bathtub cleanser and household bleach also emits chlorine gas. If ordinary soap is added to household bleach, no gases are emitted. When an unidentified cleaning agent was added to household bleach, no chlorine gas was emitted.

    If the statements above are all true, which of the following can be determined conclusively on the basis of them about the unidentified cleaning agent?

    (A) It was ordinary soap.
    (B) It was either oven cleaner or bathtub cleanser.
    (C) It was neither oven cleaner nor bathtub cleanser.
    (D) It contained ordinary soap and either oven cleaner or bathtub cleanser.
    (E) It contained ordinary soap and neither oven cleaner nor bathtub cleanser.

24. Which of the following, if true, provides the most logical completion of the passage below?

    Cars fueled by methanol have a much lower level of emissions of pollutants such as carbon monoxide and environmentally harmful hydrocarbons than gasoline-fueled cars do. Methanol fuel does produce somewhat higher formaldehyde emissions than gasoline does. Nevertheless, a methanol-powered car actually produces less atmospheric formaldehyde pollution than a comparable gasoline-powered car, because -------.

    (A) compared to carbon monoxide and some hydrocarbons produced by gasoline-powered cars, formaldehyde pollution is not a serious threat to the environment
    (B) the technical difficulties involved in mass-producing methanol-powered cars will prevent them from seriously competing with gasoline-powered cars for several years
    (C) gasoline-powered cars are required by United States law to be equipped with catalytic converters that reduce emissions of many pollutants
    (D) measuring a car's emissions is generally an accurate method of assessing that car's contribution to atmospheric pollution
    (E) most formaldehyde pollution generated by gasoline-powered cars results from the photochemical conversion of hydrocarbon emissions into formaldehyde in the atmosphere

25. Until recently experts believed that environment, not genetics, largely determines human personality. A new study, however, has shown that there is more similarity in personality between identical twins raised together than between nonidentical twins raised together. The study concluded that genetics, therefore, does play an important role in determining personality.

    Which of the following, if found to be true, would cast the most doubt on the study's conclusion?

    (A) Identical twins raised separately in different adoptive families are usually more similar in personality than are nonidentical twins raised separately in different adoptive families.
    (B) No matter how twins behave, parents treat identical twins in ways that tend to elicit similar personality traits but do not treat nonidentical twins in such ways.
    (C) Parents of both identical and nonidentical twins have long claimed that their children, from early infanthood, had definite and well-established personality traits.
    (D) Birth parents and their identical twin children tend to become more similar to each other in personality over time, but adoptive parents and their identical twin children do not.
    (E) Neither identical nor nonidentical twins are likely to display drastic changes in their individual personalities as they grow up.

SECTION 3

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. By idiosyncratically refusing to dismiss an insubordinate member of his staff, the manager not only ------- established policy, but he also ------- his heretofore good chances for promotion.

   (A) instituted. .bettered
   (B) recognized. .protected
   (C) contravened. .jeopardized
   (D) reiterated. .computed
   (E) delimited. .restricted

2. Congress is having great difficulty developing a consensus on energy policy, primarily because the policy objectives of various members of Congress rest on such ------- assumptions.

   (A) commonplace (B) trivial
   (C) explicit (D) divergent
   (E) fundamental

3. The widespread public shock at the news of the guilty verdict was caused partly by ------- news stories that had ------- acquittal.

   (A) sensational. .condemned
   (B) buried. .urged
   (C) impartial. .mentioned
   (D) biased. .predicted
   (E) local. .denounced

4. The idealized paintings of nature produced in the eighteenth century are evidence that the medieval ------- natural settings had been ------- and that the outdoors now could be enjoyed without trepidation.

   (A) fear of. .exorcised
   (B) concerns about. .regained
   (C) affection for. .surmounted
   (D) disinterest in. .alleviated
   (E) enthusiasm for. .confronted

5. Some paleontologists debate whether the diversity of species has ------- since the Cambrian period, or whether imperfections in the fossil record only suggest greater diversity today, while in actuality there has been either ------- or decreased diversity.

   (A) changed. .escalation
   (B) increased. .stasis
   (C) expanded. .discontinuity
   (D) declined. .reduction
   (E) improved. .deviation

6. Manipulating laboratory tissue cultures with hormones is one thing; using hormones to treat human beings, however, is contingent on whether hormones that ------- in the laboratory can affect ------- organisms, and in predictable ways.

   (A) develop. .similar
   (B) succeed. .simpler
   (C) fail. .cellular
   (D) work. .whole
   (E) reproduce. .unknown

7. The astronomer and feminist Maria Mitchell's own prodigious activity and the vigor of the Association for the Advancement of Women during the 1870's ------- any assertion that feminism was ------- in that period.

   (A) exclude. .thriving
   (B) contradict. .prospering
   (C) pervade. .remote
   (D) buttress. .dormant
   (E) belie. .quiescent

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. ABSORB : SPONGE ::
   (A) spin : wool
   (B) stain : detergent
   (C) pump : gasoline
   (D) seal : caulk
   (E) sharpen : pencil

9. DALLY : TIME ::
   (A) trespass : land
   (B) squander : money
   (C) shirk : task
   (D) achieve : victory
   (E) harbor : safety

10. KNIT : YARN ::
   (A) darn : sock
   (B) plait : hair
   (C) crochet : hook
   (D) braid : knot
   (E) weave : loom

11. DECIBEL : LOUDNESS ::
   (A) circumference : circle
   (B) spectrum : color
   (C) light-year : distance
   (D) meter : mile
   (E) clock : duration

12. EMBEZZLE : FUNDS ::
   (A) wield : influence
   (B) exploit : victim
   (C) usurp : power
   (D) overcome : combatant
   (E) impede : obstacle

13. NEOPHYTE : EXPERIENCE ::
   (A) diplomat : negotiation
   (B) misanthrope : cynicism
   (C) umpire : reconciliation
   (D) guru : respect
   (E) boor : sensitivity

14. REFINE : PURIFICATION ::
   (A) deflect : conformity
   (B) attenuate : rarefaction
   (C) regenerate : sustenance
   (D) standardize : disconfirmation
   (E) dilate : contraction

15. MELODRAMA : SUBTLETY ::
   (A) chimera : authenticity
   (B) parody : wit
   (C) war : strategy
   (D) brief : abstract
   (E) hypothesis : theory

16. UNTENABLE : DEFENDED ::
   (A) satiated : satisfied
   (B) heretical : considered
   (C) fragile : touched
   (D) inevitable : avoided
   (E) suspicious : doubted

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

The more that is discovered about the intricate organization of the nervous system, the more it seems remarkable that genes can successfully specify the development of that system. Human genes contain too little information even to specify which hemisphere of the brain each of a human's 10^{11} neurons should occupy, let alone the hundreds of connections that each neuron makes. For such reasons, we can assume that there must be an important random factor in neural development, and in particular, that errors must and do occur in the development of all normal brains.

The most vivid expression of such errors occurs in genetically identical (isogenic) organisms. Even when reared under the same conditions, isogenic organisms are rarely exact copies of one another, and their differences have revealed much about the random variations that result from an organism's limited supply of genetic information. In isogenic Daphniae, for example, even though the position, size, and branching pattern of each optic neuron are remarkably constant, there is some variability in connectivity, and the number of synapses varies greatly. This variability is probably the result of random scatter beyond the resolution of genetic control and is best termed "imprecision," since its converse, the degree of clustering about a mean, is conventionally called "precision."

Imprecision should be distinguished from developmental mistakes: wrongly migrated neurons, incorrect connections, and the like. To use a computer analogy, minor rounding-off errors occur universally and are analogous to imprecision, but occasionally a binary digit is incorrectly transmitted, perhaps ruining a calculation, and this incorrect transmission is analogous to a developmental mistake. Thus, imprecision is a form of inaccuracy inherent within the limits of design, but mistakes are forms of gross fallibility.

Both imprecision and gross fallibility can plausibly be blamed on the insufficiency of genetic information, since either could be reduced by adding more information. It is universally accepted among information theorists that codes and languages can be made mistake-resistant by incorporating redundancy. However, since the amount of space available in any information system is limited, increased redundancy results in decreased precision. For example, π when written incorrectly in English, "three point oen four two," can be understood correctly even though a typographical error has occurred. More precision could be gained, however, if those 24 spaces were filled with Arabic numerals; then π could be expressed to 23 significant digits, although any error would significantly change the meaning. There exists a trade-off; the more precisely a system is specified, using a given limited amount of information, the greater the danger of gross mistakes. The overall scheme by which genetic information is rationed out in organisms, therefore, must involve a compromise between two conflicting priorties: precision and the avoidance of gross mistakes.

17. Which of the following best expresses the main idea of the passage?

(A) Although studies of isogenic organisms have shown that all organisms are subject to developmental variations, there is still scientific debate over the exact causes of these variations.

(B) Because of limitations on the amount of information contained in the genes of organisms, developing nervous systems are subject to two basic kinds of error, the likelihood of one of which is reduced only when the likelihood of the other is increased.

(C) The complexity of an organism's genetic information means that much of the unusual variation that occurs among organisms can best be explained as the result of developmental mistakes.

(D) New findings about the nature of the genetic control of neural development support the work of some scientists who argue that the computer is an extremely useful model for understanding the nervous system.

(E) The major discovery made by scientists studying the genetic control of neural development is that both imprecision and gross developmental error can be traced to specific types of mutations in specific genes.

GO ON TO THE NEXT PAGE.

18. According to the passage, one of the reasons it has been assumed that there is an important random element in human neural development is that

(A) genes cannot specify certain types of developmental processes as well as they can others
(B) the intricacy of the nervous system allows small developmental errors to occur without harmful effects
(C) the amount of information contained in the genes is less than the amount necessary to specify the location of the neurons
(D) the number of neurons in the human brain varies greatly from individual to individual
(E) it is theoretically impossible for an organism to protect itself completely from gross developmental mistakes

19. The author suggests which of the following about the findings of information theorists?

(A) Their findings provocatively challenge the standard explanation of redundancy in genes.
(B) Their findings provide useful insights into understanding the rationing of genetic information.
(C) Their findings help to explain why imprecision can occur in neural development but not why gross mistakes can occur.
(D) Their findings suggest that genes may be able to specify neural development more accurately than had previously been thought.
(E) Their findings support the work of those who use computer operations as models for understanding genetic control.

20. According to the passage, of the following aspects of the optic neurons of isogenic Daphniae, which varies the most?

(A) Size
(B) Connectivity
(C) Position
(D) Branching pattern
(E) Number of synapses

21. Which of the following best describes the organization of the first paragraph?

(A) A specific case is presented, its details are analyzed, and a conclusion is drawn from it.
(B) A discovery is announced, its most significant application is discussed, and possibilities for the future are suggested.
(C) A generalization is made, specific situations in which it is applicable are noted, and problems with it are suggested.
(D) An observation is made, specifics are provided to support it, and a generalization is derived.
(E) A hypothesis is presented, its implications are clarified, and applications of it are discussed.

22. The author uses all of the following to clarify the distinction between imprecision and gross mistake in neural development EXCEPT

(A) classification of borderline phenomena
(B) a description of the relationship between the phenomena denoted by each term
(C) specific examples of the phenomena denoted by each term
(D) an explanation of at least one of the key terms involved
(E) analogies to other types of phenomena

23. Which of the following can be inferred from the passage about the genetic information of Daphniae?

I. There is probably some degree of redundancy in the information controlling neural development.
II. Most of the information for neural development stored in the genes is used to specify the positions of the optic neurons.
III. There is sufficient information to preclude the occurrence of gross mistakes during neural development.

(A) I only
(B) II only
(C) III only
(D) I and II only
(E) II and III only

GO ON TO THE NEXT PAGE.

In a recent study, David Cressy examines two central questions concerning English immigration to New England in the 1630's: what kinds of people immigrated and why? Using contemporary literary evidence, shipping lists, and customs records, Cressy finds that most adult immigrants were skilled in farming or crafts, were literate, and were organized in families. Each of these characteristics sharply distinguishes the 21,000 people who left for New England in the 1630's from most of the approximately 377,000 English people who had immigrated to America by 1700.

With respect to their reasons for immigrating, Cressy does not deny the frequently noted fact that some of the immigrants of the 1630's, most notably the organizers and clergy, advanced religious explanations for departure, but he finds that such explanations usually assumed primacy only in retrospect. When he moves beyond the principal actors, he finds that religious explanations were less frequently offered and he concludes that most people immigrated because they were recruited by promises of material improvement.

24. In the passage, the author is primarily concerned with

(A) summarizing the findings of an investigation
(B) analyzing a method of argument
(C) evaluating a point of view
(D) hypothesizing about a set of circumstances
(E) establishing categories

25. According to the passage, Cressy would agree with which of the following statements about the organizers among the English immigrants to New England in the 1630's?

I. Most of them were clergy.
II. Some of them offered a religious explanation for their immigration.
III. They did not offer any reasons for their immigration until some time after they had immigrated.
IV. They were more likely than the average immigrant to be motivated by material considerations.

(A) I only
(B) II only
(C) II and III only
(D) I, III, and IV only
(E) II, III, and IV only

26. According to the passage, Cressy has made which of the following claims about what motivated English immigrants to go to New England in the 1630's?

(A) They were motivated by religious considerations alone.
(B) They were motivated by economic considerations alone.
(C) They were motivated by religious and economic considerations equally.
(D) They were motivated more often by economic than by religious considerations.
(E) They were motivated more often by religious than by economic considerations.

27. The passage suggests that the majority of those English people who had immigrated to America by the late seventeenth century were

(A) clergy
(B) young children
(C) organized in families
(D) skilled in crafts
(E) illiterate

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. CONTINUITY:
    (A) disjunction
    (B) disability
    (C) discomfort
    (D) deceit
    (E) defection

29. LETHARGY:
    (A) flexibility
    (B) adequacy
    (C) toughness
    (D) plainness
    (E) vigor

30. STOMACH:
    (A) reformulate
    (B) anticipate
    (C) hand out freely
    (D) refuse to tolerate
    (E) lose fascination for

31. DEFAULT:
    (A) consume
    (B) resign
    (C) rely on others
    (D) desire to advance
    (E) fulfill an obligation

32. HAVEN:
    (A) challenging puzzle
    (B) gloomy cavern
    (C) dangerous place
    (D) deserted building
    (E) unhappy incident

33. OCCLUDED:
    (A) unobstructed
    (B) intersecting
    (C) extrapolated
    (D) diminished
    (E) extended

34. PLUMB:
    (A) examine superficially
    (B) answer accurately
    (C) agree
    (D) fool
    (E) abstain

35. OBSTINATE:
    (A) excitable
    (B) tractable
    (C) dispensable
    (D) gleanable
    (E) comfortable

36. PITH:
    (A) unsound opinion
    (B) previous statement
    (C) erroneous judgment
    (D) insignificant part
    (E) inconclusive evidence

37. IMPECUNIOUS:
    (A) heinous
    (B) noxious
    (C) contented
    (D) affluent
    (E) responsive

38. CANONICAL:
    (A) infelicitous
    (B) irrefutable
    (C) heterodox
    (D) minuscule
    (E) undesignated

SECTION 4

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

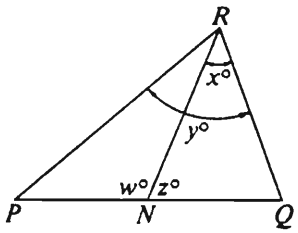
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

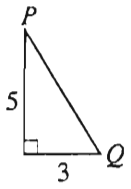


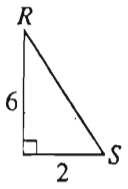
Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

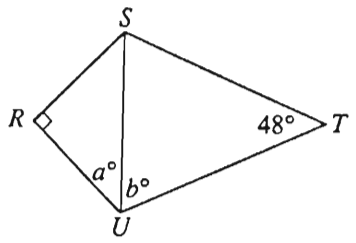
	Column A	Column B
1.	$3 + \frac{4}{5}$	$5 - \frac{4}{3}$
2.	The yearly rent for a rectangular office with dimensions 100 feet by 200 feet at the annual rate of \$20 per square foot	\$500,000
	E and F are two points on circle O. Point G is inside circle O. Point H is outside circle O.	
3.	The degree measure of $\angle EGF$	The degree measure of $\angle EHF$





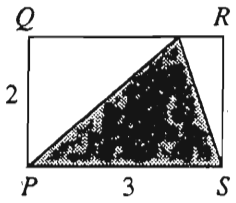
	Column A	Column B
4.	The length of PQ	The length of RS
	$x > 0$ $y - x = x$	
5.	x	y
	$a < 0$	
6.	a	$-\lvert a \rvert$

	Column A	Column B



$RS = RU$ and $TS = TU$.

7.	$a + b$	110
	The cost of 48 cans of soda is \$20.	
8.	At the same rate, the cost, in dollars, of n of these cans of soda	$(0.24)n$
	$s + t = 7$ and $2t > 3$.	
9.	s	t



10.	The area of the shaded triangular region in rectangle $PQRS$	3

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

$x^2 + kx + 7 = (x - 7)(x - 1)$ for all x.

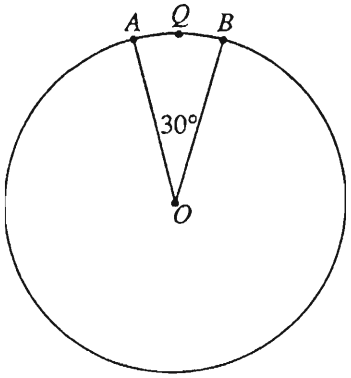
	Column A	Column B
11.	k	-7
12.	$(0.7777)^2$	$\sqrt{0.7777}$

n is a positive integer.

	Column A	Column B
13.	The remainder when $n(n + 1)$ is divided by 2	1

$(x - 1)(x + 2)(2x - 3)(3x - 6)(x + 1) = 0$

	Column A	Column B
14.	The number of possible values of x that are integers	4



The circle has center O and radius 1.

	Column A	Column B
15.	Length of arc AQB	$\frac{\pi}{6}$

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. What value of x satisfies the equation $x - 1 = 1 - x$?

(A) 2
(B) 1
(C) 0
(D) -2
(E) No value

17. Which of the following pairs of distinct lines or line segments CANNOT be parallel?

(A) Two chords of a circle
(B) Two tangents to a circle
(C) Two diameters of a circle
(D) A chord of a circle and a tangent to the same circle
(E) A diameter of a circle and a tangent to the same circle

18. If $n - 1 = \frac{2}{3}$, then $n + 1 =$

(A) $\frac{4}{3}$ (B) $\frac{5}{3}$ (C) $\frac{7}{3}$ (D) $\frac{8}{3}$ (E) $\frac{11}{3}$

19. Karl's net income is always 80 percent of his gross income. What will be the increase in Karl's net income when his gross income increases from \$20,000 to \$25,000?

(A) \$5,000
(B) \$4,000
(C) \$3,000
(D) \$2,000
(E) \$1,000

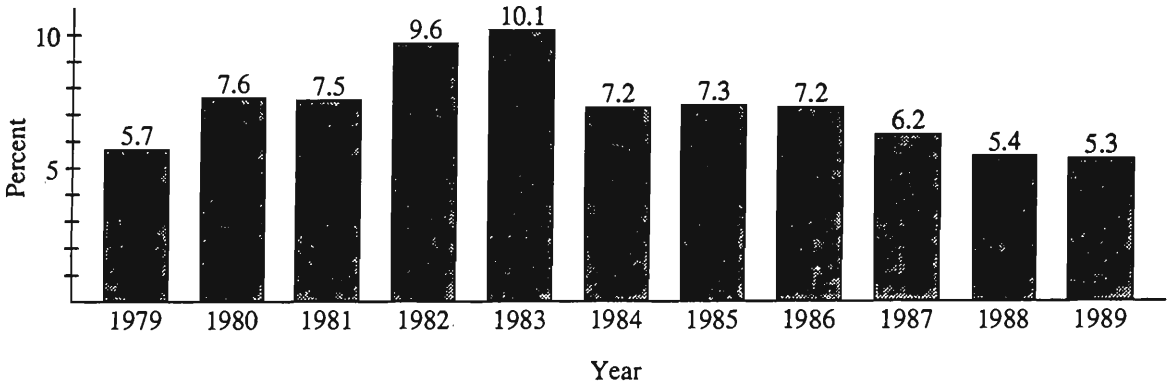
20. If a circular region has radius r and area k, then $\frac{k}{r}$ is equal to

(A) π (B) 2π (C) $\frac{\pi}{r}$ (D) $\frac{r}{\pi}$ (E) $r\pi$

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graph and table.

UNITED STATES JUNE UNEMPLOYMENT RATES AS A PERCENT OF WORK FORCE
1979-1989



UNEMPLOYMENT DATA FOR THE ELEVEN STATES WITH THE LARGEST POPULATIONS IN 1989

State	Unemployment Rate May (as a percent of state work force)	Unemployment Rate June (as a percent of state work force)	Number of Unemployed June (in thousands)
California	5.5	5.6	797
New York	5.3	5.0	439
Texas	5.9	6.1	502
Illinois	5.7	5.5	325
Pennsylvania	4.6	4.0	239
Florida	6.4	6.1	384
Ohio	5.4	5.6	307
Michigan	6.7	7.3	339
New Jersey	3.0	4.2	165
North Carolina	3.7	3.6	124
Massachusetts	3.6	4.0	126

21. In June 1989, how many of the eleven states listed had an unemployment rate greater than that for the nation as a whole?

(A) Three
(B) Four
(C) Five
(D) Six
(E) Seven

22. Of the following states, which had the greatest increase in the unemployment rate from May to June of 1989 ?

(A) New York
(B) Texas
(C) Pennsylvania
(D) Michigan
(E) New Jersey

GO ON TO THE NEXT PAGE.

23. Of the following, which was the longest period of consecutive decreases in the United States June unemployment rates?

(A) 1985 to 1989
(B) 1984 to 1989
(C) 1984 to 1987
(D) 1983 to 1989
(E) 1983 to 1984

24. The change in the unemployment rate in the United States from June 1986 to June 1987 was how many times the change in the unemployment rate from June 1988 to June 1989 ?

(A) 0.01
(B) 0.1
(C) 1.0
(D) 10.0
(E) 100.0

25. In June 1989, if a total of 6.5 million people were unemployed in the United States, then the number of people unemployed in Ohio was approximately what percent of the 6.5 million?

(A) 5.5%
(B) 4.7%
(C) 3.7%
(D) 0.5%
(E) 0.4%

GO ON TO THE NEXT PAGE.

26. Multiplying which of the following by the nonzero number $\frac{5-2x}{7}$ will give a product of -1 ?

(A) $\frac{7}{5-2x}$

(B) $\frac{-7}{2x-5}$

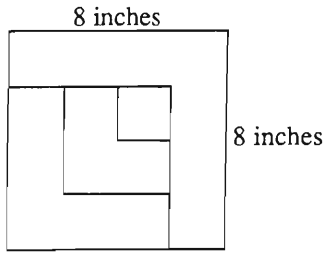
(C) $\frac{7}{2x-5}$

(D) $\frac{2x-5}{7}$

(E) $7(2x-5)$

27. If x is the smallest prime number greater than 31 and y is the largest prime number less than 58, then $x+y=$

(A) 94 (B) 90 (C) 89 (D) 88 (E) 86



28. The figure above shows a large square formed by fitting three L-shaped tiles and one small square tile together. If a rectangular floor 10 feet by 12 feet is to be tiled in large squares of this design, how many L-shaped tiles will be needed?

(A) 810
(B) 405
(C) 270
(D) 135
(E) 45

29. A manufacturer packages soap powder in containers of three different sizes. The amount of soap powder in a full large container could fill exactly 3 of the medium containers or exactly 5 of the small containers. If an equal number of small and large containers are to be filled with the amount of soap powder that would fill 90 medium containers, how many small containers will be filled?

(A) 25
(B) 27
(C) 30
(D) 45
(E) 54

30. Each of the following numbers has two digits blotted out. Which of the numbers could be the number of hours in x days, where x is an integer?

(A) 25■,■06
(B) 50■,■26
(C) 56■,■02
(D) 62■,■50
(E) 65■,■20

SECTION 5

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-7

A journal published three times a year contains exactly three articles, each of a different type, in each issue. Exactly five types of articles are printed in the journal: features, interviews, opinion roundtables, reviews, and surveys. No article is of more than one type. In choosing articles to publish during the year, the editor adheres to the following conditions:

At least one article of each type must be published each year.
The third issue of each year always contains an opinion roundtable.
No issue can include both an interview and an opinion roundtable.
No two consecutive issues can each contain surveys.
At least two issues each year must contain a feature.

1. Which of the following can be an acceptable schedule of articles for a year's worth of issues of the journal?

	First Issue	Second Issue	Third Issue
(A)	Feature Interview Review	Feature Opinion Roundtable Review	Feature Review Survey
(B)	Interview Review Survey	Feature Interview Survey	Feature Review Opinion Roundtable
(C)	Feature Review Opinion Roundtable	Feature Review Survey	Feature Interview Opinion Roundtable
(D)	Feature Interview Survey	Feature Opinion Roundtable Review	Opinion Roundtable Review Survey
(E)	Opinion Roundtable Review Survey	Feature Interview Review	Opinion Roundtable Review Survey

2. If a survey appears in the second issue of a particular year, which of the following lists the articles that must appear in the third issue of the year, not necessarily in the order given?

(A) A feature, an interview, and a review
(B) A feature, an opinion roundtable, and a review
(C) A feature, an opinion roundtable, and a survey
(D) A feature, a review, and a survey
(E) An opinion roundtable, a review, and a survey

3. If two of the article types appear three times each in a particular year's issues, those types must be

(A) a feature and an interview
(B) a feature and an opinion roundtable
(C) a feature and a review
(D) an opinion roundtable and a survey
(E) a review and a survey

GO ON TO THE NEXT PAGE.

4. If a particular year's first issue of the journal contains an opinion roundtable, then the second issue that year could contain which of the following?

   (A) Feature, opinion roundtable, review
   (B) Interview, opinion roundtable, review
   (C) Interview, review, survey
   (D) Feature, review, survey
   (E) Opinion roundtable, review, survey

5. If four of the five types of articles appear twice during a particular year and if one type appears only once, then the type that appears only once must be either

   (A) a feature or an interview
   (B) an interview or an opinion roundtable
   (C) an opinion roundtable or a review
   (D) an opinion roundtable or a survey
   (E) a review or a survey

6. If, during a particular year, two issues each contain a survey and two issues each contain an opinion roundtable, then the first issue of that year must include

   (A) a feature
   (B) an interview
   (C) an opinion roundtable
   (D) a review
   (E) a survey

7. If for a particular year the editor decides to make the second issue of the journal a special issue devoted entirely to three surveys, but continues adhering to the conditions on the choice of articles, then which of the following lists the articles, not necessarily in the order given, that must appear in the first issue of the year?

   (A) A feature, an interview, and an opinion roundtable
   (B) A feature, an interview, and a review
   (C) A feature, an opinion roundtable, and a review
   (D) An interview, an opinion roundtable, and a review
   (E) An opinion roundtable, a review, and a survey

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8. Popcorn kernels explode, or "pop," when the moisture inside the kernel is heated and steam builds up pressure inside the kernel. Uniform moisture content in a batch of popcorn kernels ensures uniform popping time, which in turn ensures fewer unpopped kernels. In practice, the percentage of unpopped kernels in a batch can be reduced by sorting popcorn kernels by size.

   Which of the following, if true, best helps explain why the percentage of unpopped kernels is lower when popcorn kernels are of uniform size?

   (A) The percentage of unpopped kernels can be reduced by increasing cooking time.
   (B) All popcorn kernels, no matter what their size, will pop under proper conditions.
   (C) Yellow popcorn kernels have more moisture content than do white or blue popcorn kernels.
   (D) A popcorn kernel's moisture content is fully determined by its size.
   (E) Damaged kernels, another cause of unpopped kernels, have a lower moisture content than intact kernels.

9. Two percent of the ocean is coastal ocean—shallow coastal waters in which most fish live. The rest is deep ocean, where fewer fish live. Much of the garbage burned or dumped on land eventually is deposited in coastal ocean. To keep coastal ocean free of garbage, therefore, garbage should be dumped in the deep ocean.

   Which of the following, if true, constitutes the strongest basis for criticizing the argument above?

   (A) Currents far below the ocean's surface bring deep-ocean waters to the coastal ocean.
   (B) Deep-ocean dumping would require a substantial change in the processing and packaging of waste.
   (C) Hazardous industrial waste has increasingly been dumped illegally into coastal-ocean waters.
   (D) There are at present no international agreements regulating dumping in the deep ocean.
   (E) The few species of fish that inhabit the deep ocean are of no commercial value.

10. Unlike the lungs and the kidneys, the liver is an organ well suited for living-donor transplants to children because the portion of the liver which must be removed from a healthy adult to replace the diseased liver of a child will be regenerated in the healthy adult within a few months.

    Which of the following, if true, provides the most additional support for the conclusion drawn above?

    (A) The success rate of liver transplants is slightly lower in children than in adults.
    (B) In removing the portion of liver for transplant there is danger of causing damage to the spleen of the donor, and that could necessitate the removal of the spleen.
    (C) There is less danger that a transplanted organ will be rejected when the organ donor is a close relative of the recipient.
    (D) There are so few suitable donors that about one-half of the babies with liver disease born in the United States each year die before they can receive a liver transplant.
    (E) Each lobe of the liver functions separately, and it is possible to extract a portion of one lobe without disrupting critical liver functions.

GO ON TO THE NEXT PAGE.

Questions 11-16

A camp counselor is organizing a game among nine campers. Three of the campers—F, G, and H—are eight year olds; the other six campers—J, K, M, O, P, and S—are nine year olds. Two teams—team 1 and team 2—will be organized. Team 1 will have four campers; team 2 will have five campers. In assigning campers to teams, the counselor observes the following restrictions:

Team 1 must have exactly two of the eight-year-old campers.
K must be on the same team as O.
F and J cannot be on either of the teams together.
M and P cannot be on either of the teams together.
If K is on the same team as P, then H must be on the team that does not include K and P.

11. Which of the following is a possible assignment of campers to the two teams?

	Team 1	Team 2
(A)	F, G, K, O	H, J, M, P, S
(B)	F, G, M, S	H, J, K, O, P
(C)	F, H, J, M	G, K, O, P, S
(D)	F, H, M, S	G, J, K, O, P
(E)	F, K, P, S	G, H, J, M, O

12. If S and O are on team 2, the campers assigned to team 1 could be

(A) F, H, K, M
(B) G, H, J, K
(C) G, H, J, P
(D) G, H, K, M
(E) G, J, M, P

13. If H and K are on team 2, which of the following is a pair of campers who must be on team 1?

(A) F and M
(B) F and O
(C) F and P
(D) J and P
(E) M and S

14. If F, M, and S are on team 1, which of the following must be true?

(A) G is on team 2.
(B) H is on team 2.
(C) K is on team 1.
(D) O is on team 1.
(E) P is on team 1.

15. If G is on the same team as H, which of the following must be true?

(A) G is on the same team as J.
(B) M is on the same team as S.
(C) P is on the same team as S.
(D) F is not on the same team as M.
(E) J is not on the same team as P.

16. Each of the following is a pair of campers who can be on team 1 together EXCEPT

(A) F and M
(B) G and H
(C) H and P
(D) J and K
(E) J and M

GO ON TO THE NEXT PAGE.

Questions 17-22

An archaeologist is excavating a system of paths used by traders in an ancient culture during a given period.

Paths have been found that lead from a manufacturing and religious center at the village of Oxa directly (without going through any of the other villages) to each of the villages Faso, Gola, Jai, and Rau; from Rau directly to each of the villages Sim and Taq; from Jai directly to the village My; and from My directly to Taq. The paths, which go to the center of each village, neither merge into nor cross each other.

Trade would have passed in both directions along any of the trading paths.

No further paths used during that period have yet been found.

A shortest route between villages is one that goes through villages that are intermediate on the route the fewest times overall.

17. On the network of paths, a trader could have traveled between the villages in which of the following pairs by going through exactly one other village?

(A) Faso and My
(B) Faso and Taq
(C) Gola and Taq
(D) My and Sim
(E) Rau and My

18. A trader must have gone through Oxa to travel on the network of discovered paths from

(A) Faso to Gola
(B) Jai to Taq
(C) My to Sim
(D) Rau to Taq
(E) Sim to Taq

19. A trader going on the network of paths from Jai to all of the villages Faso, Gola, and Taq, not necessarily in that order, by a shortest route could have gone through which of the following exactly twice?

(A) Faso
(B) My
(C) Oxa
(D) Rau
(E) Taq

20. To make a trip on the network of discovered paths from Sim to both Faso and My, not necessarily in that order, without going through any intermediate village twice, a trader must have gone from

(A) Faso to Oxa
(B) Gola to Oxa
(C) Jai to My
(D) Oxa to Jai
(E) Taq to My

21. To travel on the network of paths from Rau to all of the villages Jai, Faso, and Sim, not necessarily in that order, by a route that is shortest overall, a trader could have gone first to

(A) Oxa and last to Faso
(B) Oxa and last to Jai
(C) Oxa and last to Sim
(D) Sim and last to Faso
(E) Taq and last to Sim

22. If the archaeologist discovers that during an earlier period the path from Oxa to Jai did not yet exist, but exactly one additional path, from Gola to Taq, existed along with the other paths in the network, then during that earlier period a trader making which of the following trips by a shortest route could have passed through Gola?

(A) From Faso to Jai
(B) From Faso to Sim
(C) From Jai to Sim
(D) From Rau to My
(E) From Taq to Jai

GO ON TO THE NEXT PAGE.

23. Only in a social milieu in which many parties are scheduled for the same time do party hosts buy visually striking invitations in order to attract the invited guests to the parties. A business that produces visually striking party invitations is currently located in Los Angeles. Thus, it can be concluded that the schedule of parties in Los Angeles must be very crowded.

    The argument above is properly drawn if the truth of which of the following is assumed?

    (A) There is also a business in Los Angeles that produces ordinary party invitations.
    (B) Party guests can attend no more than one party per evening.
    (C) At most parties, there are uninvited guests who add to the number of people in attendance.
    (D) Many of the visually striking party invitations produced in Los Angeles are bought for parties in Los Angeles.
    (E) Sending party invitations is a duty that hosts rarely delegate to others.

24. The town of Stavanger, Norway, was quiet and peaceful until the early 1960's, when Stavanger became Norway's center for offshore oil exploration. Between then and now, violent crime and vandalism in Stavanger have greatly increased. Clearly, these social problems are among the results of Stavanger's oil boom.

    Which of the following, if it occurred between the early 1960's and now, gives the strongest support to the argument above?

    (A) The people of Stavanger rarely regret that their town was chosen to be Norway's center for offshore oil exploration.
    (B) Norwegian sociologists expressed grave concern about the increase in violent crime and vandalism in Stavanger.
    (C) Violent crime and vandalism have remained low in Norwegian towns that had no oil boom.
    (D) Nonviolent crime, drug addiction, and divorce in Stavanger increased approximately as much as violent crime and vandalism did.
    (E) The oil boom necessitated the building of wider roads for the increased traffic in Stavanger.

25. Students can learn mathematics only by exploring it on their own, with generous room for trial and error. For what matters in the long run is not acquiring particular computational skills (since without constant use skills rapidly fade), but knowing how to find and use suitable mathematical tools whenever they become necessary.

    If the position expressed above is correct, then each of the following can be true EXCEPT:

    (A) Mathematics teachers are often afraid that someone will ask a question that they cannot answer, and this insecurity frequently leads to authoritarianism in the classroom.
    (B) Prospective teachers should themselves learn mathematics as a process of constructing and interpreting patterns, of devising strategies for solving problems, and of discovering the beauties and applications of mathematics.
    (C) Political leaders must accept responsibility for coordinating a nationwide plan for all levels of instruction if mathematics education is to improve.
    (D) The most effective method for teaching students mathematics is for teachers to state the definitive rule for solving exercises of a given type and then to insist on rote practice in its proper application.
    (E) Most current teaching presents mathematics as established doctrine, stressing the production of right answers rather than the ability to communicate reasons.

SECTION 6

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Only by ignoring decades of mismanagement and inefficiency could investors conclude that a fresh infusion of cash would provide anything more than a ------- solution to the company's financial woes.

   (A) fair
   (B) temporary
   (C) genuine
   (D) realistic
   (E) complete

2. Although the discovery of antibiotics led to great advances in clinical practice, it did not represent a ------- bacterial illness, for there are some bacteria that cannot be ------- treated with antibiotics.

   (A) breakthrough in. .consistently
   (B) panacea for. .effectively
   (C) neglect of. .efficiently
   (D) reexamination of. .conventionally
   (E) resurgence of. .entirely

3. A misconception frequently held by novice writers is that sentence structure mirrors thought: the more convoluted the structure, the more ------- the ideas.

   (A) complicated
   (B) inconsequential
   (C) elementary
   (D) fanciful
   (E) blatant

4. Jones was unable to recognize the contradictions in his attitudes that were obvious to everyone else; even the hint of an untruth was ------- to him, but he ------- serious trouble by always cheating on his taxes.

   (A) acceptable. .risked
   (B) exciting. .averted
   (C) repugnant. .courted
   (D) anathema. .evaded
   (E) tempting. .hazarded

5. Even though the general's carefully qualified public statement could hardly be -------, some people took ------- it.

   (A) respected. .liberties with
   (B) inoffensive. .umbrage at
   (C) faulted. .exception to
   (D) credited. .potshots at
   (E) dismissed. .interest in

6. Though feminist in its implications, Yvonne Rainer's 1974 film ------- the filmmaker's active involvement in feminist politics.

   (A) preserved
   (B) portrayed
   (C) encouraged
   (D) renewed
   (E) antedated

7. The chances that a species will ------- are reduced if any vital function is restricted to a single kind of organ; ------- by itself possesses an enormous survival advantage.

   (A) degenerate. .complexity
   (B) expire. .size
   (C) disappear. .variety
   (D) flourish. .symmetry
   (E) persist. .redundancy

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. PLEASURE : ECSTASY ::
   (A) complacence : envy
   (B) surprise : astonishment
   (C) anxiety : curiosity
   (D) pride : vexation
   (E) pity : dread

9. LIMERICK : POEM ::
   (A) lampoon : satire
   (B) setting : play
   (C) fable : moral
   (D) material : collage
   (E) plot : character

10. SOUND : AIR ::
   (A) oil : tanker
   (B) signal : wave
   (C) electricity : copper
   (D) light : camera
   (E) x-ray : lead

11. INDELIBILITY : ERASURE ::
   (A) impermeability : passage
   (B) enumeration : ordering
   (C) illegibility : writing
   (D) reactiveness : stimulation
   (E) reflectivity : visibility

12. EXPIATE : GUILT ::
   (A) canvass : support
   (B) adorn : appearance
   (C) testify : conviction
   (D) correct : error
   (E) preach : conversion

13. INFILTRATE : ENTER ::
   (A) comply : index
   (B) invade : assault
   (C) allege : prove
   (D) insinuate : say
   (E) disclose : announce

14. OVERTURE : OPERA ::
   (A) preamble : statute
   (B) gambit : move
   (C) climax : story
   (D) actor : cast
   (E) commencement : graduate

15. PUNGENT : ODOR ::
   (A) caustic : comment
   (B) durable : substance
   (C) constant : period
   (D) ominous : threat
   (E) excessive : responsibility

16. ATTACK : VANQUISHED ::
   (A) woo : adored
   (B) smother : choked
   (C) spy : investigated
   (D) goad : provoked
   (E) guess : calculated

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

[This passage was excerpted from an article published in 1975.]

Is the literary critic like the poet, responding creatively, intuitively, subjectively to the written word as the poet responds to human experience? Or is the critic more like a scientist, following a series of demonstrable, verifiable steps, using an objective method of analysis?

For the woman who is a practitioner of feminist literary criticism, the subjectivity *versus* objectivity, or critic-as-artist-or-scientist, debate has special significance; for her, the question is not only academic, but political as well, and her definition will court special risks whichever side of the issue it favors. If she defines feminist criticism as objective and scientific—a valid, verifiable, intellectual method that anyone, whether man or woman, can perform —the definition not only precludes the critic-as-artist approach, but may also impede accomplishment of the utilitarian political objectives of those who seek to change the academic establishment and its thinking, especially about sex roles. If she defines feminist criticism as creative and intuitive, privileged as art, then her work becomes vulnerable to the prejudices of stereotypic ideas about the ways in which women think, and will be dismissed by much of the academic establishment. Because of these prejudices, women who use an intuitive approach in their criticism may find themselves charged with inability to be analytical, to be objective, or to think critically. Whereas men may be free to claim the role of critic-as-artist, women run different professional risks when they choose intuition and private experience as critical method and defense.

These questions are political in the sense that the debate over them will inevitably be less an exploration of abstract matters in a spirit of disinterested inquiry than an academic power struggle in which the careers and professional fortunes of many women scholars—only now entering the academic profession in substantial numbers—will be at stake, and with them the chances for a distinctive contribution to humanistic understanding, a contribution that might be an important influence against sexism in our society.

As long as the academic establishment continues to regard objective analysis as "masculine" and an intuitive approach as "feminine," the theoretician must steer a delicate philosophical course between the two. If she wishes to construct a theory of feminist criticism, she would be well advised to place it within the framework of a general theory of the critical process that is neither purely objective nor purely intuitive. Her theory is then more likely to be compared and contrasted with other theories of criticism with some degree of dispassionate distance.

17. Which of the following titles best summarizes the content of the passage?

(A) How Theories of Literary Criticism Can Best Be Used
(B) Problems Confronting Women Who Are Feminist Literary Critics
(C) A Historical Overview of Feminist Literary Criticism
(D) A New Theory of Literary Criticism
(E) Literary Criticism: Art or Science?

18. It can be inferred that the author believes which of the following about women who are literary critics?

I. They can make a unique contribution to society.
II. They must develop a new theory of the critical process.
III. Their criticisms of literature should be entirely objective.

(A) I only
(B) II only
(C) I and III only
(D) II and III only
(E) I, II, and III

19. The author specifically mentions all of the following as difficulties that particularly affect women who are theoreticians of feminist literary criticism EXCEPT the

(A) tendency of a predominantly male academic establishment to form preconceptions about women
(B) limitations that are imposed when criticism is defined as objective and scientific
(C) likelihood that the work of a woman theoretician who claims the privilege of art will be viewed with prejudice by some academics
(D) inescapability of power struggles between women in the academic profession and the academic establishment
(E) tendency of members of the academic establishment to treat all forms of feminist literary theory with hostility

GO ON TO THE NEXT PAGE.

20. According to the author, the debate mentioned in the passage has special significance for the woman who is a theoretician of feminist literary criticism for which of the following reasons?

(A) There are large numbers of capable women working within the academic establishment.
(B) There are a few powerful feminist critics who have been recognized by the academic establishment.
(C) Like other critics, most women who are literary critics define criticism as either scientific or artistic.
(D) Women who are literary critics face professional risks different from those faced by men who are literary critics.
(E) Women who are literary critics are more likely to participate in the debate than are men who are literary crictics.

21. Which of the following is presented by the author in support of the suggestion that there is stereotypic thinking among members of the academic establishment?

(A) A distinctively feminist contribution to humanistic understanding could work against the influence of sexism among members of the academic establishment.
(B) Women who define criticism as artistic may be seen by the academic establishment as being incapable of critical thinking.
(C) The debate over the role of the literary critic is often seen as a political one.
(D) Women scholars are only now entering academia in substantial numbers.
(E) The woman who is a critic is forced to construct a theory of literary criticism.

22. Which of the following is most likely to be one of the "utilitarian political objectives" mentioned by the author in line 16 ?

(A) To forge a new theory of literary criticism
(B) To pursue truth in a disinterested manner
(C) To demonstrate that women are interested in literary criticism that can be viewed either subjectively or objectively
(D) To convince the academic establishment to revise the ways in which it assesses women scholars' professional qualities
(E) To dissuade women who are literary critics from taking a subjective approach to literary criticism

23. It can be inferred that the author would define as "political" (line 30) questions that

(A) are contested largely through contentions over power
(B) are primarily academic in nature and open to abstract analysis
(C) are not in themselves important
(D) cannot be resolved without extensive debate
(E) will be debated by both men and women

GO ON TO THE NEXT PAGE.

[This passage was excerpted from an article published in 1979.]

Quantum mechanics is a highly successful theory: it supplies methods for accurately calculating the results of diverse experiments, especially with minute particles. The predictions of quantum mechanics, however, give only the probability of an event, not a deterministic statement of whether or not the event will occur. Because of this probabilism, Einstein remained strongly dissatisfied with the theory throughout his life, though he did not maintain that quantum mechanics is wrong. Rather, he held that it is incomplete: in quantum mechanics the motion of a particle must be described in terms of probabilities, he argued, only because some parameters that determine the motion have not been specified. If these hypothetical "hidden parameters" were known, a fully deterministic trajectory could be defined. Significantly, this hidden-parameter quantum theory leads to experimental predictions different from those of traditional quantum mechanics. Einstein's ideas have been tested by experiments performed since his death, and as most of these experiments support traditional quantum mechanics, Einstein's approach is almost certainly erroneous.

24. The author regards the idea that traditional quantum mechanics is incomplete with

(A) approval
(B) surprise
(C) indifference
(D) apprehension
(E) skepticism

25. It can be inferred from the passage that the author's conclusion that Einstein's approach is "erroneous" (line 22) might have to be modified because

(A) it is theoretically possible to generate plausible theories with hidden parameters within them
(B) some experimental tests of Einstein's theory do not disconfirm the hidden-parameter theory of quantum mechanics
(C) it is possible for a theory to have hidden parameters and yet be probabilistic
(D) traditional quantum mechanics has not yet been used to analyze all of the phenomena to which it could be applied
(E) there are too many possible hidden parameters to develop meaningful tests of hidden-parameter theories

26. According to the passage, Einstein posed objections to the

(A) existence of hidden parameters in quantum theory
(B) probabilistic nature of quantum mechanics
(C) idea that quantum mechanics is incomplete
(D) results of experiments testing quantum theory
(E) importance accorded quantum mechanics in physics

27. The passage suggests that which of the following would have resulted if the experiments mentioned in lines 18-20 had not supported the predictions of traditional quantum mechanics?

(A) Einstein, had he been alive, would have revised his approach to quantum mechanics.
(B) Hidden-parameter theories would have been considered inaccurate descriptions of real-world phenomena.
(C) A deterministic description of the motion of a particle might still be considered possible.
(D) Quantum mechanics would have ceased to attract the attention of physicists.
(E) Einstein, had he been alive, would have abandoned attempts to specify the hidden parameters that describe motion.

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. INGEST:
    (A) throw around
    (B) take along
    (C) expel
    (D) uncover
    (E) enlarge

29. SCRUTINY:
    (A) awkwardness
    (B) misunderstanding
    (C) casual glance
    (D) simple movement
    (E) slight injury

30. SLEW:
    (A) uncertain supply
    (B) unwanted interference
    (C) unsuitable arrangement
    (D) poor beginning
    (E) limited quantity

31. NEGATION:
    (A) allegiance
    (B) affirmation
    (C) guarantee
    (D) acquittal
    (E) validity

32. SATE:
    (A) dehydrate
    (B) enervate
    (C) initiate
    (D) quaff
    (E) starve

33. DISPOSED:
    (A) disinclined
    (B) disrupted
    (C) determined
    (D) derided
    (E) depressed

34. JIBE:
    (A) surpass
    (B) prevent
    (C) qualify
    (D) conflict
    (E) collect

35. APPRECIABLE:
    (A) interminable
    (B) unsatisfactory
    (C) tentative
    (D) timid
    (E) imperceptible

36. ARTLESSNESS:
    (A) zest
    (B) sense
    (C) mania
    (D) quirkiness
    (E) guile

37. FATUITY:
    (A) desiccation
    (B) sagacity
    (C) veracity
    (D) confirmation
    (E) artifice

38. PROPITIATE:
    (A) antagonize
    (B) discourage
    (C) repress
    (D) forsake
    (E) deceive

FOR GENERAL TEST 12 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 3			Section 6		
Number	Answer	P+	Number	Answer	P+
1	C	87	1	B	86
2	D	81	2	B	67
3	D	84	3	A	71
4	A	63	4	C	72
5	B	62	5	C	68
6	D	66	6	E	64
7	E	48	7	E	29
8	D	79	8	B	87
9	B	82	9	A	64
10	B	62	10	C	58
11	C	55	11	A	58
12	C	54	12	D	51
13	E	48	13	D	46
14	B	41	14	A	46
15	A	43	15	A	39
16	D	50	16	D	26
17	B	46	17	B	75
18	C	54	18	A	34
19	B	40	19	E	49
20	E	68	20	D	70
21	D	51	21	B	69
22	A	51	22	D	54
23	A	27	23	A	58
24	A	56	24	E	56
25	B	40	25	B	38
26	D	78	26	B	56
27	E	28	27	C	41
28	A	89	28	C	93
29	E	85	29	C	87
30	D	83	30	E	84
31	E	79	31	B	79
32	C	79	32	E	48
33	A	55	33	A	46
34	A	46	34	D	38
35	B	51	35	E	41
36	D	35	36	E	34
37	D	27	37	B	29
38	C	28	38	A	17

QUANTITATIVE ABILITY					
Section 1			Section 4		
Number	Answer	P+	Number	Answer	P+
1	A	94	1	A	78
2	D	89	2	B	91
3	B	73	3	D	84
4	B	70	4	B	72
5	C	60	5	B	79
6	A	85	6	C	73
7	A	59	7	A	68
8	D	26	8	A	64
9	A	64	9	D	69
10	A	74	10	C	57
11	B	49	11	B	56
12	C	36	12	B	53
13	B	35	13	B	45
14	C	52	14	C	38
15	D	24	15	C	47
16	C	83	16	B	87
17	E	81	17	C	73
18	A	63	18	D	77
19	B	75	19	B	79
20	D	39	20	E	61
21	C	86	21	D	88
22	B	68	22	E	87
23	B	62	23	A	84
24	C	52	24	D	73
25	E	40	25	B	40
26	E	78	26	C	48
27	A	45	27	B	37
28	B	64	28	A	29
29	A	36	29	A	25
30	E	26	30	E	19

ANALYTICAL ABILITY					
Section 2			Section 5		
Number	Answer	P+	Number	Answer	P+
1	B	85	1	D	83
2	E	77	2	B	88
3	E	61	3	C	56
4	D	60	4	C	50
5	A	58	5	B	45
6	C	40	6	E	44
7	C	64	7	B	70
8	A	62	8	D	87
9	A	81	9	A	80
10	D	72	10	E	84
11	D	60	11	D	78
12	A	73	12	C	69
13	B	48	13	C	56
14	B	36	14	A	53
15	D	17	15	A	35
16	E	19	16	D	26
17	B	67	17	E	41
18	A	52	18	A	50
19	D	41	19	C	48
20	A	32	20	E	33
21	E	31	21	D	34
22	E	35	22	A	25
23	C	51	23	D	67
24	E	38	24	C	70
25	B	44	25	D	37

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 12 ONLY AND THE PERCENTS BELOW*

Raw Score	Verbal Scaled Score	Verbal % Below	Quantitative Scaled Score	Quantitative % Below	Analytical Scaled Score	Analytical % Below
73-76	800	99				
72	790	99				
71	780	99				
70	760	99				
69	750	98				
68	730	97				
67	720	96				
66	700	94				
65	690	94				
64	670	91				
63	660	90				
62	650	88				
61	640	87				
60	630	85	800	96		
59	620	84	800	96		
58	600	80	800	96		
57	600	80	800	96		
56	590	78	790	95		
55	580	76	780	93		
54	570	73	770	92		
53	560	71	750	88		
52	550	69	740	87		
51	540	66	730	84		
50	530	63	720	82	800	98
49	520	60	710	80	800	98
48	520	60	690	77	800	98
47	510	58	680	75	800	98
46	500	55	670	73	800	98
45	490	52	660	70	780	97
44	480	50	640	66	770	97
43	470	47	630	64	760	96
42	470	47	620	62	740	94
41	460	43	610	60	730	93
40	450	40	600	58	720	92
39	440	37	580	53	710	90
38	440	37	570	50	690	87
37	430	34	560	48	680	85
36	420	31	550	46	670	83
35	410	28	540	43	650	79
34	410	28	530	41	640	77
33	400	25	520	39	620	72
32	390	22	510	36	610	70
31	390	22	500	34	590	64
30	380	20	490	32	580	61
29	370	18	480	30	560	56
28	370	18	470	27	550	52
27	360	15	460	25	530	47
26	350	13	450	23	520	44
25	340	11	430	19	500	38
24	340	11	420	17	490	36
23	330	9	410	15	470	30
22	320	8	400	14	450	26
21	310	7	380	11	440	23
20	300	5	370	9	420	19
19	290	4	360	8	410	17
18	280	3	350	7	390	14
17	270	2	330	5	370	11
16	260	2	320	4	360	9
15	250	1	310	3	340	7
14	250	1	290	2	330	6
13	240	1	270	1	310	4
12	220	1	260	1	290	3
11	200	1	240	1	280	2
10	200	1	230	1	270	2
9	200	1	210	1	260	1
8	200	1	200	1	240	1
7	200	1	200	1	230	1
6	200	1	200	1	210	1
0-5	200	1	200	1	200	1

*Percent scoring below the scaled score is based on the performance of 1,040,336 examinees who took the General Test between October 1, 1988, and September 30, 1991. This percent below information is used for score reports during the 1992-93 testing year.

TEST 13

SECTION 1

Time—30 minutes

38 Questions

Directions: Each sentence that follows has one or two blanks, each blank indicating that something has been omitted. Following the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. The availability of oxygen is an essential ------- for animal life, while carbon dioxide is equally ------- for plant life.

   (A) choice. .optional
   (B) duplication. .selective
   (C) conversion. .exchangeable
   (D) condition. .necessary
   (E) luxury. .harmful

2. Prudery actually draws attention to the vice it is supposed to -------; the very act that forbids speech or prohibits sight ------- what is hidden.

   (A) condemn. .distorts
   (B) monitor. .signals
   (C) repress. .dramatizes
   (D) obviate. .fosters
   (E) divulge. .conceals

3. After thirty years of television, people have become "speed watchers"; consequently, if the camera lingers, the interest of the audience -------.

   (A) broadens (B) begins (C) varies
   (D) flags (E) clears

4. Compared mathematically to smoking and driving, almost everything else seems relatively risk-free, ------- almost nothing seems worth regulating.

   (A) yet (B) since (C) so
   (D) even though (E) as long as

5. Ironically, Carver's precision in sketching lives on the edge of despair ensures that his stories will sometimes be read too narrowly, much as Dickens' social-reformer role once caused his broader concerns to be -------.

   (A) ignored (B) reinforced (C) contradicted
   (D) diminished (E) diversified

6. The demise of the rigorous academic curriculum in high school resulted, in part, from the progressive rhetoric that ------- the study of subjects previously thought ------- as part of school learning.

   (A) advocated. .necessary
   (B) enhanced. .indispensable
   (C) restricted. .impractical
   (D) undermined. .popular
   (E) sanctioned. .inappropriate

7. While some see in practical jokes a wish for mastery in miniature over a world that seems very -------, others believe that the jokes' purpose is to disrupt, by reducing all transactions to -------.

   (A) dubious. .confusion
   (B) disorderly. .symmetry
   (C) harmonious. .dissonance
   (D) unruly. .chaos
   (E) turbulent. .uniformity

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. ATHLETE : TROPHY :: (A) detective : badge (B) presenter : award (C) soldier : medal (D) bettor : stake (E) musician : instrument

9. ARTICULATE : UNCLEAR ::
(A) assign : unencumbered
(B) elaborate : sketchy
(C) explain : lucid
(D) grieve : somber
(E) march : planned

10. INVENTORY : STOCK :: (A) calculation : ledger (B) poll : balloting (C) survey : territory (D) census : population (E) petition : names

11. LOGIC : REASONING ::
(A) sensitivity : morality
(B) arrogance : leadership
(C) ethics : behavior
(D) creativity : enthusiasm
(E) bravery : charisma

12. MIMICRY : CAMOUFLAGE ::
(A) photosynthesis : pollination
(B) territoriality : migration
(C) hibernation : generation
(D) mutation : variation
(E) digestion : rumination

13. APPREHENSION : TERROR ::
(A) interest : conspiracy
(B) affection : adoration
(C) indifference : animosity
(D) reluctance : termination
(E) anxiety : faith

14. LUMBER : GRACE :: (A) dissemble : pretense (B) relent : energy (C) castigate : justice (D) waver : resolution (E) insinuate : subtlety

15. CAUSTIC : EAT AWAY ::
(A) hormone : inhibit
(B) reagent : bind
(C) explosive : destroy
(D) synthetic : substitute
(E) desiccant : dry

16. MALINGERER : DUTY ::
(A) scholar : pedantry (B) recluse : humanity (C) rebel : responsibility (D) miser : wealth (E) patron : criticism

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Classical physics defines the vacuum as a state of absence: a vacuum is said to exist in a region of space if there is nothing in it. In the quantum field theories that describe the physics of elementary particles, the vacuum becomes somewhat more complicated. Even in empty space, particles can appear spontaneously as a result of fluctuations of the vacuum. For example, an electron and a positron, or antielectron, can be created out of the void. Particles created in this way have only a fleeting existence; they are annihilated almost as soon as they appear, and their presence can never be detected directly. They are called virtual particles in order to distinguish them from real particles, whose lifetimes are not constrained in the same way, and which can be detected. Thus it is still possible to define the vacuum as a space that has no real particles in it.

One might expect that the vacuum would always be the state of lowest possible energy for a given region of space. If an area is initially empty and a real particle is put into it, the total energy, it seems, should be raised by at least the energy equivalent of the mass of the added particle. A surprising result of some recent theoretical investigations is that this assumption is not invariably true. There are conditions under which the introduction of a real particle of finite mass into an empty region of space can reduce the total energy. If the reduction in energy is great enough, an electron and a positron will be spontaneously created. Under these conditions the electron and positron are not a result of vacuum fluctuations but are real particles, which exist indefinitely and can be detected. In other words, under these conditions the vacuum is an unstable state and can decay into a state of lower energy; i.e., one in which real particles are created.

The essential condition for the decay of the vacuum is the presence of an intense electric field. As a result of the decay of the vacuum, the space permeated by such a field can be said to acquire an electric charge, and it can be called a charged vacuum. The particles that materialize in the space make the charge manifest. An electric field of sufficient intensity to create a charged vacuum is likely to be found in only one place: in the immediate vicinity of a superheavy atomic nucleus, one with about twice as many protons as the heaviest natural nuclei known. A nucleus that large cannot be stable, but it might be possible to assemble one next to a vacuum for long enough to observe the decay of the vacuum. Experiments attempting to achieve this are now under way.

17. Which of the following titles best describes the passage as a whole?

(A) The Vacuum: Its Fluctuations and Decay
(B) The Vacuum: Its Creation and Instability
(C) The Vacuum: A State of Absence
(D) Particles That Materialize in the Vacuum
(E) Classical Physics and the Vacuum

18. According to the passage, the assumption that the introduction of a real particle into a vacuum raises the total energy of that region of space has been cast into doubt by which of the following?

(A) Findings from laboratory experiments
(B) Findings from observational field experiments
(C) Accidental observations made during other experiments
(D) Discovery of several erroneous propositions in accepted theories
(E) Predictions based on theoretical work

19. It can be inferred from the passage that scientists are currently making efforts to observe which of the following events?

(A) The decay of a vacuum in the presence of virtual particles
(B) The decay of a vacuum next to a superheavy atomic nucleus
(C) The creation of a superheavy atomic nucleus next to an intense electric field
(D) The creation of a virtual electron and a virtual positron as a result of fluctuations of a vacuum
(E) The creation of a charged vacuum in which only real electrons can be created in the vacuum's region of space

GO ON TO THE NEXT PAGE.

20. Physicists' recent investigations of the decay of the vacuum, as described in the passage, most closely resemble which of the following hypothetical events in other disciplines?

(A) On the basis of data gathered in a carefully controlled laboratory experiment, a chemist predicts and then demonstrates the physical properties of a newly synthesized polymer.
(B) On the basis of manipulations of macroeconomic theory, an economist predicts that, contrary to accepted economic theory, inflation and unemployment will both decline under conditions of rapid economic growth.
(C) On the basis of a rereading of the texts of Jane Austen's novels, a literary critic suggests that, contrary to accepted literary interpretations, Austen's plots were actually metaphors for political events in early nineteenth-century England.
(D) On the basis of data gathered in carefully planned observations of several species of birds, a biologist proposes a modification in the accepted theory of interspecies competition.
(E) On the basis of a study of observations incidentally recorded in ethnographers' descriptions of non-Western societies, an anthropologist proposes a new theory of kinship relations.

21. According to the passage, the author considers the reduction of energy in an empty region of space to which a real particle has been added to be

(A) a well-known process
(B) a frequent occurrence
(C) a fleeting aberration
(D) an unimportant event
(E) an unexpected outcome

22. According to the passage, virtual particles differ from real particles in which of the following ways?

I. Virtual particles have extremely short lifetimes.
II. Virtual particles are created in an intense electric field.
III. Virtual particles cannot be detected directly.

(A) I only
(B) II only
(C) III only
(D) I and II only
(E) I and III only

23. The author's assertions concerning the conditions that lead to the decay of the vacuum would be most weakened if which of the following occurred?

(A) Scientists created an electric field next to a vacuum, but found that the electric field was not intense enough to create a charged vacuum.
(B) Scientists assembled a superheavy atomic nucleus next to a vacuum, but found that no virtual particles were created in the vacuum's region of space.
(C) Scientists assembled a superheavy atomic nucleus next to a vacuum, but found that they could not then detect any real particles in the vacuum's region of space.
(D) Scientists introduced a virtual electron and a virtual positron into a vacuum's region of space, but found that the vacuum did not then fluctuate.
(E) Scientists introduced a real electron and a real positron into a vacuum's region of space, but found that the total energy of the space increased by the energy equivalent of the mass of the particles.

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Simone de Beauvoir's work greatly influenced Betty Friedan's—indeed, made it possible. Why, then, was it Friedan who became the prophet of women's emancipation in the United States? Political conditions, as well as a certain anti-intellectual bias, prepared Americans and the American media to better receive Friedan's deradicalized and highly pragmatic *The Feminine Mystique*, published in 1963, than Beauvoir's theoretical reading of women's situation in *The Second Sex*. In 1953 when *The Second Sex* first appeared in translation in the United States, the country had entered the silent, fearful fortress of the anticommunist McCarthy years (1950-1954), and Beauvoir was suspected of Marxist sympathies. Even *The Nation*, a generally liberal magazine, warned its readers against "certain political leanings" of the author. Open acknowledgement of the existence of women's oppression was too radical for the United States in the fifties, and Beauvoir's conclusion, that change in women's economic condition, though insufficient by itself, "remains the basic factor" in improving women's situation, was particularly unacceptable.

24. According to the passage, one difference between *The Feminine Mystique* and *The Second Sex* is that Friedan's book

    (A) rejects the idea that women are oppressed
    (B) provides a primarily theoretical analysis of women's lives
    (C) does not reflect the political beliefs of its author
    (D) suggests that women's economic condition has no impact on their status
    (E) concentrates on the practical aspects of the question of women's emancipation

25. The author quotes from *The Nation* most probably in order to

    (A) modify an earlier assertion
    (B) point out a possible exception to her argument
    (C) illustrate her central point
    (D) clarify the meaning of a term
    (E) cite an expert opinion

26. It can be inferred from the passage that which of the following is not a factor in the explanation of why *The Feminine Mystique* was received more positively in the United States than was *The Second Sex*?

    (A) By 1963 political conditions in the United States had changed.
    (B) Friedan's book was less intellectual and abstract than Beauvoir's.
    (C) Readers did not recognize the powerful influence of Beauvoir's book on Friedan's ideas.
    (D) Friedan's approach to the issue of women's emancipation was less radical than Beauvoir's.
    (E) American readers were more willing to consider the problem of the oppression of women in the sixties than they had been in the fifties.

27. According to the passage, Beauvoir's book asserted that the status of women

    (A) is the outcome of political oppression
    (B) is inherently tied to their economic condition
    (C) can be best improved under a communist government
    (D) is a theoretical, rather than a pragmatic, issue
    (E) is a critical area of discussion in Marxist economic theory

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. STERILIZE: (A) uncover (B) irritate (C) contaminate (D) operate (E) agitate

29. INADVERTENT: (A) well known (B) quite similar (C) fortunate (D) normal (E) intentional

30. SUBLIMINAL: (A) adroit (B) gentle (C) downcast (D) able to be manipulated (E) at a perceptible level

31. PLACATE: (A) avert (B) antagonize (C) procure (D) subside (E) revolt

32. INUNDATE: (A) drain (B) erupt (C) exit (D) decelerate (E) disturb

33. FLOURISH:
(A) lack of consistency
(B) lack of embellishment
(C) lack of sense
(D) lack of spontaneity
(E) lack of substance

34. SUMMARILY:
(A) after long deliberation
(B) with benevolent intent
(C) in general disagreement
(D) under close scrutiny
(E) from questionable premises

35. STOLID: (A) excitable (B) friendly (C) slender (D) brittle (E) weak

36. IDYLL:
(A) negative appraisal
(B) pedestrian argument
(C) object created for a purpose
(D) experience fraught with tension
(E) action motivated by greed

37. ASPERITY:
(A) failure of imagination
(B) brevity of speech
(C) sureness of judgment
(D) mildness of temper
(E) lack of beauty

38. DESULTORY:
(A) highly inimical
(B) cheerfully accepted
(C) strongly highlighted
(D) lightly considered
(E) strictly methodical

SECTION 2

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

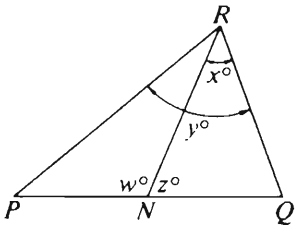
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

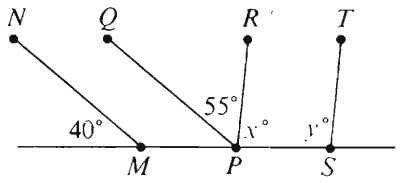
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	$3{,}960 \div 65$	60

Team X scored 10 points in the first half of a certain game. In the second half of the game, team Y scored 15 points more than team X.

2.	The number of points scored by team X in the first half of the game	The number of points scored by team Y in the first half of the game

3.	$\frac{5}{8}$	$\frac{7}{11}$



$MN \parallel PQ$ and $PR \parallel ST$

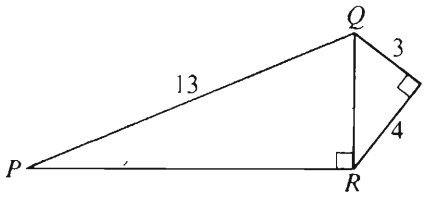
4.	$y - x$	15

$$\frac{3}{4}y - 5 = 7$$

5.	y	15

6.	90 percent of 30	13.5 percent of 200

	Column A	Column B

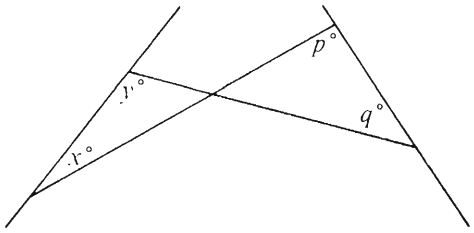


7.	The perimeter of triangle PQR	36

$$x > y > w > 0$$

8.	$\frac{xy}{w}$	$\frac{yw}{x}$

9.	$4 + 2\sqrt{2}$	$2 + 4\sqrt{2}$

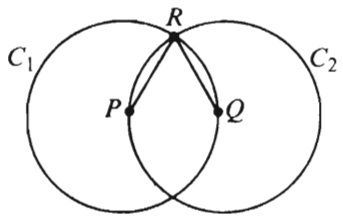


10.	$x + y$	$p + q$

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	On a turntable, a record of radius 6 inches is rotating at the rate of 45 revolutions per minute.	
11.	The number of inches traveled per minute by a point on the circumference of the record	The number of inches traveled per minute by a point on the record 5 inches from the center of the record
12.	The greatest even factor of 180 that is less than 90	The greatest odd factor of 180



In circles C_1 and C_2, the length of segment PR equals the length of segment QR.

13.	The circumference of circle C_1	The circumference of circle C_2

	Column A	Column B
	In a history class that consisted of 30 students, the number of seniors was 3 more than twice the number of juniors, and $\frac{3}{10}$ of the students were neither juniors nor seniors.	
14.	The number of juniors in the class	6
15.	$4x^2 + 4y^2$	$(2x + 2y)^2$

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Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

---

16. If 25 percent of a certain number is 1,600, what is 10 percent of the number?

    (A) 40
    (B) 400
    (C) 640
    (D) 1,440
    (E) 4,000

17. The ratio of 1.8 to 2 is equal to the ratio of

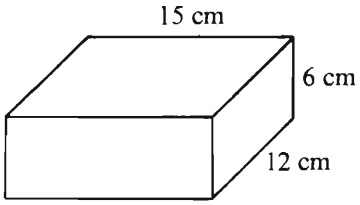
    (A) 9 to 1
    (B) 9 to 10
    (C) 9 to 20
    (D) 18 to 100
    (E) 18 to 200

18. If $2x + 7 = 12$, then $4x - 7 =$

    (A) 2 (B) 2.5 (C) 3 (D) 10 (E) 13

19. If $x + y = n$, then $x^2 + 2xy + y^2 =$

    (A) $2n$
    (B) n^2
    (C) $n(x - y)$
    (D) $n^2 + 2y(n - y)$
    (E) $n^2 + xn - x^2$



20. What is the maximum number of cubes, each 3 centimeters on an edge, that can be packed into a rectangular box with inside dimensions as shown above?

    (A) 360 (B) 120 (C) 90 (D) 40 (E) 20

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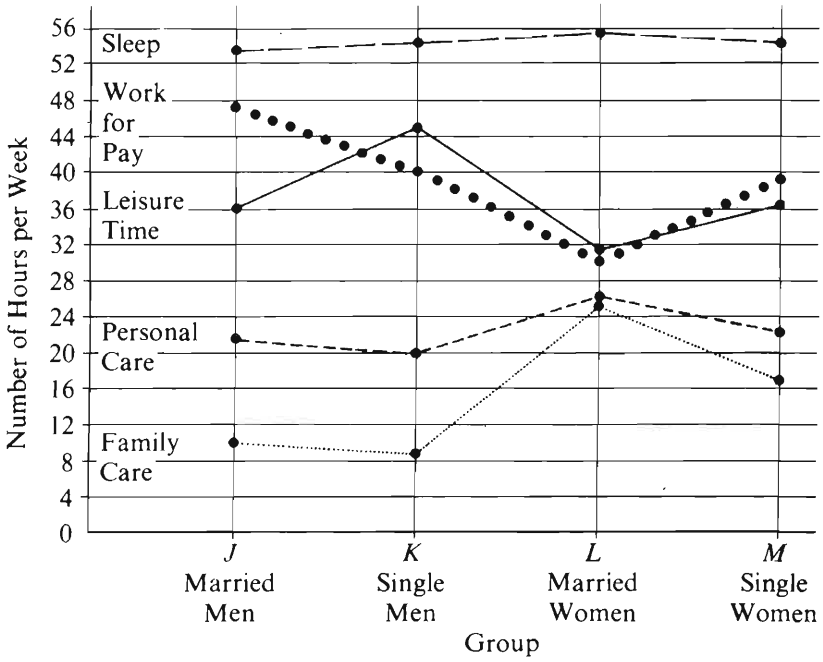
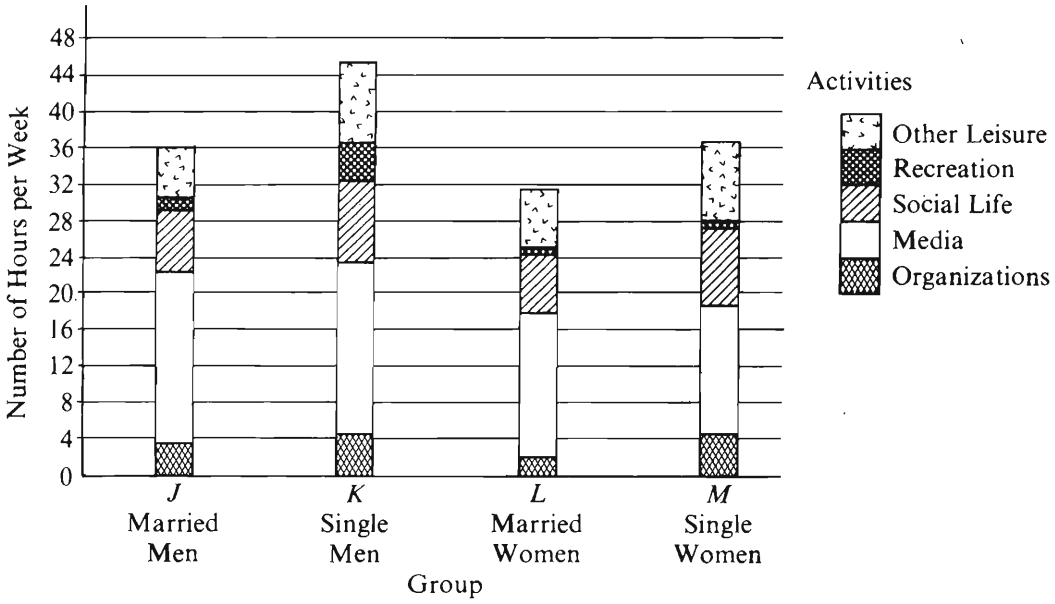
Questions 21-25 refer to the following graphs.

AVERAGE NUMBER OF HOURS PER WEEK SPENT IN MAJOR TYPES OF ACTIVITIES BY EMPLOYED PERSONS



AVERAGE NUMBER OF HOURS PER WEEK SPENT IN LEISURE-TIME ACTIVITIES BY EMPLOYED PERSONS



Note: Graphs drawn to scale.

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21. In which major type of activity is the average number of hours spent per week most nearly the same for all four groups?

(A) Sleep
(B) Work for pay
(C) Leisure time
(D) Personal care
(E) Family care

22. Approximately what is the average number of hours per week that employed single women spend in leisure-time activities?

(A) 47 (B) 39 (C) 37 (D) 30 (E) 17

23. Approximately what is the average number of hours per week that employed married men spend on media activities?

(A) 12
(B) 16
(C) 19
(D) 22
(E) 25

24. Which of the following lists the four groups from least to greatest with respect to the average number of hours per week that each spends working for pay?

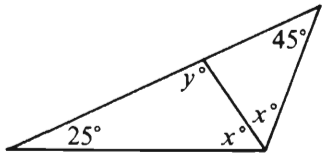
(A) J, K, M, L
(B) J, L, M, K
(C) L, J, M, K
(D) L, K, M, J
(E) L, M, K, J

25. Approximately what percent of the average number of hours per week spent in leisure-time activities by employed single men is spent on social-life activities?

(A) 5% (B) 9% (C) 15%
(D) 20% (E) 27%

26. If x is an integer and $y = 9x + 13$, what is the greatest value of x for which y is less than 100?

(A) 12 (B) 11 (C) 10 (D) 9 (E) 8



27. What is the value of y in the figure above?

(A) 70 (B) 80 (C) 90
(D) 100 (E) 110

28. What is the perimeter, in meters, of a rectangular playground 24 meters wide that has the same area as a rectangular playground 64 meters long and 48 meters wide?

(A) 112
(B) 152
(C) 224
(D) 256
(E) 304

29. Saplings are to be planted 30 feet apart along one side of a straight lane 455 feet long. If the first sapling is to be planted at one end of the lane, how many saplings are needed?

(A) 18 (B) 16 (C) $15\frac{1}{6}$ (D) 15 (E) 14

30. The average (arithmetic mean) of five numbers is 25. After one of the numbers is removed, the average (arithmetic mean) of the remaining numbers is 31. What number has been removed?

(A) 1
(B) 6
(C) 11
(D) 24
(E) It cannot be determined from the information given.

SECTION 3
Time—30 minutes
25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-7

Seven musical selections—H, I, J, K, M, O, and P—must appear on a single two-sided long-playing record. For a given side, any choice of selections and any sequence of selections will be acceptable so long as the following conditions are met:

P must be first or last on a side.
H must be placed on the same side as M, either immediately before M or immediately after M.
I cannot be placed on the same side as K.
O can be placed on the same side as H, but neither immediately before nor immediately after H.
Side 1 cannot begin with K.
Each side must have at least two selections.
Each selection must appear on the record exactly one time.

1. If side 2 begins with K, which of the following selections must appear on side 1 ?

(A) H
(B) I
(C) J
(D) M
(E) O

2. If side 1 has exactly three selections and the first is O, which of the following could be the other two selections on side 1 ?

(A) H followed by I
(B) I followed by K
(C) J followed by H
(D) K followed by P
(E) P followed by J

3. Which of the following is a possible arrangement, in order, of the seven musical selections?

	Side 1	Side 2
(A)	H, M, K, P	I, O, J
(B)	P, O, H, M	K, I, J
(C)	I, O, J	M, H, P, K
(D)	J, O, M	H, I, P, K
(E)	K, H, P	O, M, I, J

4. If I and J are the only selections on side 1, which of the following is a possible order of the selections for side 2 ?

(A) H, M, O, P, K
(B) K, H, O, M, P
(C) M, H, O, K, P
(D) P, H, M, O, K
(E) P, M, O, K, H

5. If side 2 contains exactly four selections, beginning with M and ending with K, which of the following must be true?

(A) H appears on side 1.
(B) I appears on side 2.
(C) J appears on side 2.
(D) O is the first selection on side 1.
(E) P is the last selection on side 1.

6. If O, H, and P are among the selections on side 1, which of the following must be true?

(A) I appears on side 1.
(B) K appears on side 2.
(C) J is the first selection on side 2.
(D) Side 2 has exactly three selections.
(E) Side 1 has exactly five selections.

7. If I, J, and P are all of the selections that appear on side 1, and side 2 begins with M, which of the following must be true?

(A) The second selection on side 2 is K.
(B) The third selection on side 2 is H.
(C) The third selection on side 2 is O.
(D) The last selection on side 2 is H.
(E) The last selection on side 2 is O.

GO ON TO THE NEXT PAGE.

8. Many farmers in the United States are turning away from synthetic fertilizers and pesticides, whose costs are rising rapidly, and choosing systems of organic farming designed to replenish nutrients in the soil. Studies indicate that although in some instances crop yields are lower in the years immediately after a farmer converts from a chemical to an organic system, the farmer's net income in each of those years is nevertheless likely to be higher.

   Which of the following, if true, would help explain why the farmer's annual net income is likely to be higher following conversion to an organic system?

   (A) The most successful systems of organic farming are intended to ensure the continued productivity of farmland.
   (B) The amount of money the farmer loses by reducing crop yield is generally less than the amount the farmer saves in production costs by switching from chemical farming to an organic system.
   (C) Farmers for whom environmental concerns are paramount are willing to take financial losses to avoid synthetic fertilizers and pesticides.
   (D) By growing nitrogen-fixing plants alongside a cash crop over a period of years, a farmer can usually increase crop yield dramatically.
   (E) Many farmers who have purchased equipment used in chemical farming feel that they have irrevocably committed themselves to using synthetic fertilizers and pesticides.

9. For some years health authorities have believed that people with high blood pressure (hypertension) should restrict their salt intake. Recently scientists found in a large, well-designed study that those with chronic hypertension consume less salt than do their counterparts with normal blood pressure.

   If it is true that a diet relatively high in salt is causally linked to the onset of hypertension, which of the following, if true, most plausibly accounts for the new findings?

   (A) Only a minority of those with hypertension have been properly diagnosed.
   (B) Chronic hypertension is not a serious problem in the population studied.
   (C) Most people with chronic hypertension have intentionally restricted their salt intake.
   (D) Hypertension occurs most frequently in those who have a family history of hypertension.
   (E) Excess salt intake is inherently dangerous to health.

*10. A successful defense against attack by ballistic missiles would have to be controlled by a large-scale computer system.

   A defense against attack by ballistic missiles, to be successful, would have to work on first use, and a full preliminary test would be impossible.

   Despite careful planning, every large-scale computer system has on use proved to have flaws that in some situations would cause serious failure.

   If the statements above are true, which of the following conclusions is best supported by them?

   (A) If care is taken in planning the computer system to be used for defense against attack by ballistic missiles, there is a high probability that the defense system will be successful if and when it is needed.
   (B) Methods for reducing errors in constructing large-scale computer systems will not be found.
   (C) A defense against ballistic missile attack will not work successfully when it is first called on.
   (D) Some means for control other than a large-scale computer system will have to be found for a system for defense against ballistic missiles.
   (E) A defense against attack by ballistic missiles cannot be assured of success the first time it is used.

GO ON TO THE NEXT PAGE.

Questions 11-16

A builder is planning the colors to be used for painting the rooms and hallways of a group of new houses. The builder will use only one color for each room or hallway and will select from the following colors: warm colors—rose and peach; neutral colors—ivory and gold; cool colors—aqua, blue, and lavender.

Two colors are adjacent if two rooms, two hallways, or a room and a hallway that are painted in the colors are connected by a door. The builder will observe the following restrictions:

No two different warm colors can be adjacent.
No two different cool colors can be adjacent.
Aqua cannot be adjacent to peach or rose.
Lavender cannot be adjacent to ivory.

There are no further restrictions.

11. Which of the following colors can be used for painting a hallway that is connected by doors to only two rooms, which will be painted aqua and blue?

(A) Rose
(B) Peach
(C) Ivory
(D) Aqua
(E) Lavender

12. The builder can use which of the following color schemes where the only doors in two adjacent rooms are doors that connect the rooms to each other and connect each of the rooms to a common hallway, itself not connected to any other rooms?

	First Room	Second Room	Hallway
(A)	Rose	Peach	Ivory
(B)	Aqua	Gold	Ivory
(C)	Aqua	Ivory	Blue
(D)	Ivory	Blue	Lavender
(E)	Rose	Gold	Aqua

13. Which of the following color schemes can the builder use for three rooms and a hallway if there are doors between room 1 and room 2 and between room 2 and room 3, and if room 1 and room 3 are both connected by doors to a common hallway?

	Room 1	Room 2	Room 3	Hallway
(A)	Blue	Ivory	Rose	Lavender
(B)	Aqua	Rose	Ivory	Lavender
(C)	Blue	Ivory	Rose	Ivory
(D)	Lavender	Blue	Lavender	Rose
(E)	Ivory	Blue	Aqua	Rose

14. Which of the following colors can be used for a hallway that is connected by doors to each of seven rooms, when each of the rooms will be painted a different color?

(A) Rose
(B) Peach
(C) Ivory
(D) Gold
(E) Aqua

15. Which of the following colors can be used for a room that is connected by doors to each of three rooms that are painted lavender, blue, and peach, respectively?

(A) Ivory
(B) Rose
(C) Peach
(D) Blue
(E) Aqua

16. The builder can use all of the colors in which of the following sets of colors to paint the rooms and hallways on an entire floor, no matter how the doors are arranged among the rooms and hallways?

(A) Ivory, gold
(B) Aqua, lavender
(C) Aqua, ivory, blue
(D) Rose, peach, ivory
(E) Rose, ivory, aqua

GO ON TO THE NEXT PAGE.

Questions 17-22

In a certain emergency medical practice, seven physicians—N, O, P, R, S, T, and U—are assigned to accompany three mobile trauma vans during a single 12-hour shift. Each physician must be assigned to just one of the vans according to the following rules:

At least two physicians must be assigned to van 1.
At least three physicians, one of whom must be S, must be assigned to van 3.
If N is assigned to van 1, R must also be assigned to van 1.
O must be assigned to van 2.
U cannot be assigned to van 3.

17. Which of the following is a possible assignment of the seven physicians to the three vans?

	Van 1	Van 2	Van 3
(A)	N	O, P, R	S, T, U
(B)	N, R	O, S	P, T, U
(C)	N, O	R, U	P, S, T
(D)	R, U	O, N	P, S, T
(E)	R, O	P, U	N, S, T

18. If R is assigned to van 2, which of the following must be true?

(A) N is assigned to van 1.
(B) T is assigned to van 3.
(C) P is assigned to van 1.
(D) P is assigned to van 3.
(E) U is assigned to van 1.

19. If N and U are assigned to van 1, all of the following must be true EXCEPT:

(A) P is assigned to van 2.
(B) T is assigned to van 3.
(C) Exactly one physician is assigned to van 2.
(D) Exactly three physicians are assigned to van 1.
(E) Exactly three physicians are assigned to van 3.

20. If R and U are the only physicians assigned to van 1, which of the following is the largest group of physicians that could possibly be assigned to van 3 ?

(A) O, P
(B) P, T
(C) N, S, T
(D) N, P, S, T
(E) O, P, S, T

21. If exactly three physicians are assigned to van 1, which of the following must be true?

(A) N is assigned to van 3.
(B) R is assigned to van 1.
(C) T is assigned to van 1.
(D) N is assigned to the same van as R.
(E) O alone is assigned to van 2.

22. If R is the only physician not yet assigned, and if, at this point, R could be assigned to any one of the three vans, which of the following must be true?

(A) N is assigned to van 1.
(B) P is assigned to van 1.
(C) P is assigned to van 3.
(D) T is assigned to van 3.
(E) U is assigned to van 1.

---

23. For acrylic, a clear rigid plastic, to be cast, fairly complex molecules must be induced to link up, in a process called polymerization. Polymerization is exothermic; i.e., its net effect is that each time molecules link, a small quantity of heat is generated. In addition, the rate of linking speeds up as temperature increases.

Which of the following can be inferred from the passage above?

(A) The method used to trigger the process of polymerization is a sharp increase in the temperature of the surrounding air.
(B) Unless the heat that results from the linking of molecules is drawn off promptly, there will be a heat buildup at an accelerating rate as acrylic is cast.
(C) In the casting of thin sheets of acrylic, which lose heat quickly to the surrounding air, polymerization proceeds much faster than it does in the casting of thick pieces.
(D) If air temperatures are kept steady when acrylic is cast, the rate at which the molecules link remains constant.
(E) Once the process of polymerization has been induced, it cannot be slowed before all possible links among molecules have been formed.

GO ON TO THE NEXT PAGE.

24. A steady decline in annual movie-ticket sales is about to begin. More than half of the tickets sold last year were sold to the age group under twenty-five years of age, representing twenty-seven percent of the population. However, the number of individuals under twenty-five will steadily decline during the next decade.

Which of the following, if true, casts most doubt on the prediction above regarding future movie-ticket sales?

(A) Medical advances have lowered the mortality rates for those who are forty to sixty years of age.
(B) Many people gradually lose interest in going to the movies after they reach twenty-five years of age.
(C) The number of movie theaters has been increasing, and this trend is expected to continue during the next ten years.
(D) Movie-ticket sales tend to increase as the size of the work force increases, and the size of the work force will increase annually during the next decade.
(E) Experts agree that people under twenty-five years of age will continue to account for more than half of the total number of tickets sold in each of the next ten years.

25. Any lender about to make a loan wishes to know the real rate of interest; i.e., the contractual rate of interest less the rate of inflation. But what rate of inflation to use, past or expected? Past inflation is the better choice, because we have specific firm figures for it so that the real rate of interest will also emerge as a specific figure.

Which of the following, if true, is the strongest point that an opponent of the position above might make in arguing that the rate of expected inflation is the proper figure to use?

(A) Since the contractual interest is future income to a prospective lender, it is more appropriate to adjust that income in terms of inflation expected for the future.
(B) Since estimating the rate of expected inflation presupposes careful economic analysis, lenders might derive coincidental benefits from doing such an estimate.
(C) The rate of expected inflation will differ little from the rate of past inflation when inflation is steady.
(D) No official rate of past inflation is computed for any period shorter than a month.
(E) The official rate of past inflation is a figure that depends on what commodities, in what proportions, determine the official price index.

SECTION 4
Time — 30 minutes
38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Aspartame, a new artificial sugar substitute, is only ------- replacement for saccharin because, unlike saccharin, it breaks down and loses its sweetening characteristics at high temperatures, making it ------- for baking.

   (A) an interim. .ideal
   (B) an apparent. .excellent
   (C) a potential. .versatile
   (D) a significant. .problematic
   (E) a partial. .unsuitable

2. Trapped thousands of years ago in Antarctic ice, recently discovered air bubbles are ------- time capsules filled with information for scientists who chart the history of the atmosphere.

   (A) inconsequential (B) broken (C) veritable (D) resplendent (E) impenetrable

3. In the days before the mass marketing of books, censorship was ------- source of -------, which helped the sale of the book and inspired Ralph Waldo Emerson to remark: "Every burned book enlightens the world."

   (A) a respected. .opinion
   (B) a constant. .guidance
   (C) a prime. .publicity
   (D) an unnoticed. .opposition
   (E) an unpromising. .criticism

4. It was not only the ------- of geologists that ------- earlier development of the revolutionary idea that the Earth's continents were moving plates; classical physicists, who could not then explain the mechanism, had declared continental movement impossible.

   (A) indecisiveness. .challenged
   (B) radicalism. .deterred
   (C) conservatism. .hindered
   (D) assumptions. .hastened
   (E) resistance. .mandated

5. Although often extremely critical of the medical profession as a whole, people are rarely willing to treat their personal doctors with equal -------.

   (A) impetuosity (B) sarcasm (C) mockery (D) contempt (E) condescension

6. Aalto, like other modernists, believed that form follows function; consequently, his furniture designs asserted the ------- of human needs, and the furniture's form was ------- human use.

   (A) universality. .refined by
   (B) importance. .relegated to
   (C) rationale. .emphasized by
   (D) primacy. .determined by
   (E) variability. .reflected in

7. A ------- acceptance of contemporary forms of social behavior has misled a few into believing that values in conflict with the present age are for all practical purposes -------.

   (A) casual. .reliable
   (B) superficial. .trenchant
   (C) complacent. .superseded
   (D) cautious. .redemptive
   (E) plaintive. .redundant

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. TEACHER : CERTIFICATION ::
   (A) driver : license (B) officer : handcuffs
   (C) librarian : book (D) mechanic : tool
   (E) architect : blueprint

9. FOOD : NOURISH :: (A) organ : secrete
   (B) fluids : circulate (C) cells : degenerate
   (D) antibodies : protect (E) fats : saturate

10. HACK : CARVE :: (A) grind : polish
    (B) snip : mince (C) hew : fell
    (D) whet : blunt (E) gouge : engrave

11. DETOXIFY : POISON :: (A) determine : certainty
    (B) destabilize : deviance (C) disguise : costume
    (D) dissolve : liquid (E) dehydrate : water

12. SUPERIMPOSE : ABOVE ::
    (A) permeate : beside (B) focus : around
    (C) insert : between (D) splice : below
    (E) fuse : behind

13. TAMPER : ADJUST ::
    (A) misrepresent : communicate
    (B) warp : deform
    (C) confess : tell
    (D) mar : deface
    (E) undermine : stop

14. METAPHOR : LITERAL ::
    (A) biography : accurate
    (B) melody : spoken
    (C) poem : rhythmic
    (D) anthem : patriotic
    (E) ballet : intricate

15. COURAGE : RASHNESS ::
    (A) generosity : prodigality
    (B) temperance : modesty
    (C) mettle : spirit
    (D) honor : humility
    (E) compassion : contempt

16. PRESCIENCE : FUTURE ::
    (A) irrationality : sanity
    (B) predictability : past
    (C) irascibility : emotions
    (D) erudition : esoterica
    (E) talkativeness : loquacity

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

One of the questions of interest in the study of the evolution of spiders is whether the weaving of orb webs evolved only once or several times. About half the 35,000 known kinds of spiders make webs; a third of the web weavers make orb webs. Since most orb weavers belong either to the Araneidae or the Uloboridae families, the origin of the orb web can be determined only by ascertaining whether the families are related.

Recent taxonomic analysis of individuals from both families indicates that the families evolved from different ancestors, thereby contradicting Wiehle's theory. This theory postulates that the families must be related, based on the assumption that complex behavior, such as web building, could evolve only once. According to Kullman, web structure is the only characteristic that suggests a relationship between families. The families differ in appearance, structure of body hair, and arrangement of eyes. Only Uloborids lack venom glands. Further identification and study of characteristic features will undoubtedly answer the question of the evolution of the orb web.

17. The primary purpose of the passage is to

(A) settle the question of whether orb webs evolved once or more than once
(B) describe scientific speculation concerning an issue related to the evolution of orb webs
(C) analyze the differences between the characteristic features of spiders in the Araneidae and Uloboridae families
(D) question the methods used by earlier investigators of the habits of spiders
(E) demonstrate that Araneidae spiders are not related to Uloboridae spiders

18. It can be inferred from the passage that all orb-weaving spiders belong to types of spiders that

(A) lack venom glands
(B) are included either in the Uloboridae or Araneidae families
(C) share few characteristic features with other spider types
(D) comprise less than a third of all known types of spiders
(E) are more recently evolved than other types of spiders

19. According to the passage, members of the Araneidae family can be distinguished from members of the Uloboridae family by all of the following EXCEPT

(A) the presence of venom glands
(B) the type of web they spin
(C) the structure of their body hair
(D) the arrangement of their eyes
(E) their appearance

20. Which of the following statements, if true, most weakens Wiehle's theory that complex behavior could evolve only once?

(A) Horses, introduced to the New World by the Spaniards, thrived under diverse climatic conditions.
(B) Plants of the Palmaceae family, descendants of a common ancestor, evolved unique seed forms even though the plants occupy similar habitats throughout the world.
(C) All mammals are descended from a small, rodentlike animal whose physical characteristics in some form are found in all its descendants.
(D) Plants in the Cactaceae and Euphorbiaceae families, although they often look alike and have developed similar mechanisms to meet the rigors of the desert, evolved independently.
(E) The Cuban anole, which was recently introduced in the Florida wilds, is quickly replacing the native Florida chameleon because the anole has no competitors.

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"Popular art" has a number of meanings, impossible to define with any precision, which range from folklore to junk. The poles are clear enough, but the middle tends to blur. The Hollywood Western of the 1930's, for example, has elements of folklore, but is closer to junk than to high art or folk art. There can be great trash, just as there is bad high art. The musicals of George Gershwin are great popular art, never aspiring to high art. Schubert and Brahms, however, used elements of popular music—folk themes—in works clearly intended as high art. The case of Verdi is a different one: he took a popular genre—bourgeois melodrama set to music (an accurate definition of nineteenth-century opera)—and, without altering its fundamental nature, transmuted it into high art. This remains one of the greatest achievements in music, and one that cannot be fully appreciated without recognizing the essential trashiness of the genre.

As an example of such a transmutation, consider what Verdi made of the typical political elements of nineteenth-century opera. Generally in the plots of these operas, a hero or heroine—usually portrayed only as an individual, unfettered by class—is caught between the immoral corruption of the aristocracy and the doctrinaire rigidity or secret greed of the leaders of the proletariat. Verdi transforms this naïve and unlikely formulation with music of extraordinary energy and rhythmic vitality, music more subtle than it seems at first hearing. There are scenes and arias that still sound like calls to arms and were clearly understood as such when they were first performed. Such pieces lend an immediacy to the otherwise veiled political message of these operas and call up feelings beyond those of the opera itself.

Or consider Verdi's treatment of character. Before Verdi, there were rarely any characters at all in musical drama, only a series of situations which allowed the singers to express a series of emotional states. Any attempt to find coherent psychological portrayal in these operas is misplaced ingenuity. The only coherence was the singer's vocal technique: when the cast changed, new arias were almost always substituted, generally adapted from other operas. Verdi's characters, on the other hand, have genuine consistency and integrity, even if, in many cases, the consistency is that of pasteboard melodrama. The integrity of the character is achieved through the music: once he had become established, Verdi did not rewrite his music for different singers or countenance alterations or substitutions of somebody else's arias in one of his operas, as every eighteenth-century composer had done. When he revised an opera, it was only for dramatic economy and effectiveness.

21. The author refers to Schubert and Brahms in order to suggest

(A) that their achievements are no less substantial than those of Verdi
(B) that their works are examples of great trash
(C) the extent to which Schubert and Brahms influenced the later compositions of Verdi
(D) a contrast between the conventions of nineteenth-century opera and those of other musical forms
(E) that popular music could be employed in compositions intended as high art

22. According to the passage, the immediacy of the political message in Verdi's operas stems from the

(A) vitality and subtlety of the music
(B) audience's familiarity with earlier operas
(C) portrayal of heightened emotional states
(D) individual talents of the singers
(E) verisimilitude of the characters

23. According to the passage, all of the following characterize musical drama before Verdi EXCEPT

(A) arias tailored to a particular singer's ability
(B) adaptation of music from other operas
(C) psychological inconsistency in the portrayal of characters
(D) expression of emotional states in a series of dramatic situations
(E) music used for the purpose of defining a character

GO ON TO THE NEXT PAGE.

24. It can be inferred that the author regards Verdi's revisions to his operas with

(A) regret that the original music and texts were altered
(B) concern that many of the revisions altered the plots of the original work
(C) approval for the intentions that motivated the revisions
(D) puzzlement, since the revisions seem largely insignificant
(E) enthusiasm, since the revisions were aimed at reducing the conventionality of the operas' plots

25. According to the passage, one of Verdi's achievements within the framework of nineteenth-century opera and its conventions was to

(A) limit the extent to which singers influenced the musical composition and performance of his operas
(B) use his operas primarily as forums to protest both the moral corruption and dogmatic rigidity of the political leaders of his time
(C) portray psychologically complex characters shaped by the political environment surrounding them
(D) incorporate elements of folklore into both the music and plots of his operas
(E) introduce political elements into an art form that had traditionally avoided political content

26. Which of the following best describes the relationship of the first paragraph of the passage to the passage as a whole?

(A) It provides a group of specific examples from which generalizations are drawn later in the passage.
(B) It leads to an assertion that is supported by examples later in the passage.
(C) It defines terms and relationships that are challenged in an argument later in the passage.
(D) It briefly compares and contrasts several achievements that are examined in detail later in the passage.
(E) It explains a method of judging a work of art, a method that is used later in the passage.

27. It can be inferred that the author regards the independence from social class of the heroes and heroines of nineteenth-century opera as

(A) an idealized but fundamentally accurate portrayal of bourgeois life
(B) a plot convention with no real connection to political reality
(C) a plot refinement unique to Verdi
(D) a symbolic representation of the position of the bourgeoisie relative to the aristocracy and the proletariat
(E) a convention largely seen as irrelevant by audiences

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. PERISH: (A) move on (B) survive (C) come after (D) transgress (E) strive

29. UNPREDICTABLE: (A) sensitive (B) compliant (C) dependable (D) mature (E) laudable

30. TRIBUTE: (A) denunciation (B) torment (C) betrayal (D) menace (E) penalty

31. FINESSE: (A) indecision (B) heavy-handedness (C) extroversion (D) extravagance (E) competitiveness

32. SAP: (A) reinstate (B) condone (C) bolster (D) satiate (E) facilitate

33. CONVOLUTED: (A) symmetrical (B) separate (C) straightforward (D) completely flexible (E) consistently calm

34. MITIGATE: (A) exacerbate (B) preponderate (C) accelerate (D) elevate (E) extrapolate

35. TORPOR: (A) rigidity (B) randomness (C) agility (D) obscurity (E) vigor

36. ZENITH: (A) decline (B) anticlimax (C) foundation (D) nadir (E) abyss

37. VENAL: (A) pleasant (B) clever (C) healthy (D) unstinting (E) incorruptible

38. PERIPATETIC: (A) stationary (B) enclosed (C) discrete (D) essential (E) careful

SECTION 5

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

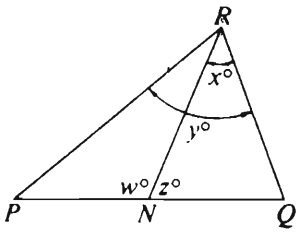
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

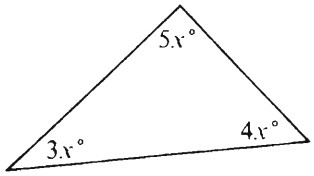
Examples 2-4 refer to $\triangle PQR$.

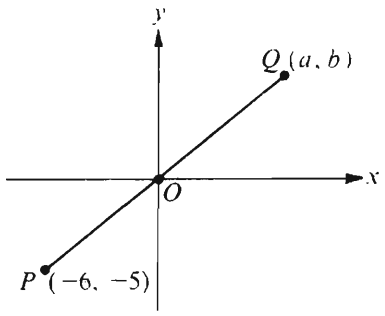
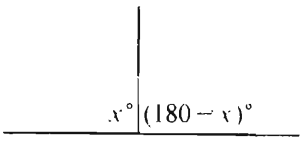


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	$\frac{2}{3}\left(1-\frac{1}{3}\right)$	$\frac{2}{9}$
	$n = \frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\frac{1}{16}$	
2.	$1-n$	$\frac{1}{16}$
3.	5^3	3^5
	R and S are distinct points on a circle of radius 1.	
4.	The length of line segment RS	2
	$x < 5$ and $y > 12$.	
5.	$y - x$	7
6.	 x	20
7.	$\frac{\sqrt{8}}{\sqrt{2}}$	$\frac{\sqrt{12}}{\sqrt{3}}$

	Column A	Column B
		
8.	a	b
	$3x = 4y$ $xy \neq 0$	
9.	The ratio of x to y	The ratio of y to x
		
10.	x	$180 - x$

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A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	The area of a circular region having a radius of $\frac{1}{4}$ meter is x square meters.	
11.	x	$\frac{1}{4}$

	Column A	Column B
12.	The cost of x pounds of meat at y dollars per pound	The cost of y yards of material at x dollars per yard

$$(a + 5)(a - 5) = 0$$
$$(b + 5)(b - 5) = 0$$

	Column A	Column B
13.	$a + 5$	$b + 5$

	Column A	Column B
	Average (arithmetic mean) of Test Scores in Class R	

Average score for the boys	90
Average score for the girls	81
Average score for the class	84

	Column A	Column B
14.	The number of boys in the class who took the test	The number of girls in the class who took the test

$$x > 1$$
$$y > 1$$

	Column A	Column B
15.	$\dfrac{1}{\frac{1}{x} + \frac{1}{y}}$	$\frac{1}{x} + \frac{1}{y}$

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

---

16. If $\frac{1}{7}$ of a certain number is 4, then $\frac{1}{4}$ of the number is

(A) $\frac{7}{16}$

(B) 2

(C) $\frac{16}{7}$

(D) 7

(E) 28

17. At College C there are from 2 to 4 introductory philosophy classes each semester, and each of these classes has from 20 to 30 students enrolled. If one semester 10 percent of the students enrolled in introductory philosophy failed, what is the greatest possible number who failed?

(A) 12
(B) 10
(C) 8
(D) 6
(E) 3

18. The lengths of the sides of triangle T are $x + 1$, $2x$, and $3x$. The sum of the degree measures of the three interior angles of T is

(A) $6x$
(B) $60x$
(C) 90
(D) 180
(E) not determinable from the information given

19. Today is Jack's 12th birthday and his father's 40th birthday. How many years from today will Jack's father be twice as old as Jack is at that time?

(A) 12
(B) 14
(C) 16
(D) 18
(E) 20

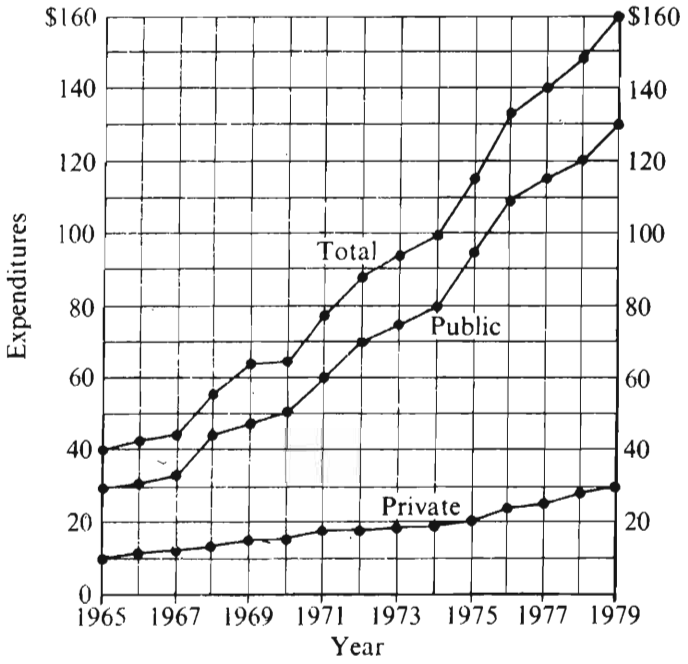
20. If $a + b = 10$, then $\left(a + \frac{b}{2}\right) + \left(b + \frac{a}{2}\right) =$

(A) 5
(B) 10
(C) 15
(D) 20
(E) 25

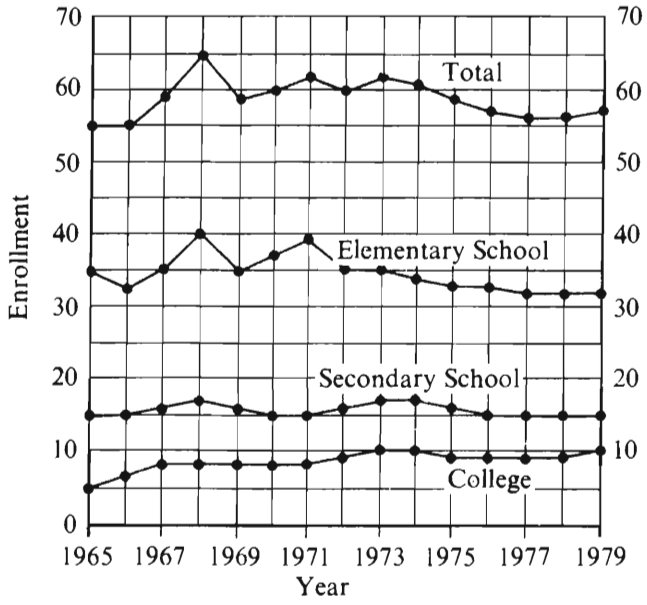
GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graphs.

PUBLIC AND PRIVATE SCHOOL EXPENDITURES
1965-1979
(in billions of dollars)
(1 billion = 1,000,000,000)



SCHOOL ENROLLMENT BY LEVEL OF INSTRUCTION
1965-1979
(in millions of students)



21. Of the following years, which showed the least difference between public school expenditures and private school expenditures?

(A) 1965
(B) 1970
(C) 1974
(D) 1978
(E) 1979

22. For each year from 1965 to 1979, the total enrollment in college, secondary school, and elementary school was in which of the following ranges?

(A) 50 to 60 million
(B) 55 to 60 million
(C) 55 to 65 million
(D) 60 to 65 million
(E) 60 to 70 million

23. In 1970, approximately how many billion dollars were spent on public elementary schools?

(A) 37
(B) 50
(C) 60
(D) 87
(E) It cannot be determined from the information given.

24. Which of the following periods showed a continual increase in the total school enrollment?

(A) 1967-1969
(B) 1969-1971
(C) 1971-1973
(D) 1973-1975
(E) 1975-1977

25. In 1972, public school expenditures were approximately what percent of the total school expenditures for that year?

(A) 20%
(B) 60%
(C) 70%
(D) 80%
(E) 90%

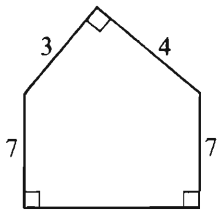
GO ON TO THE NEXT PAGE.

26. If the sum of the first n positive integers is equal to $\frac{n(n+1)}{2}$, then the sum of the first 25 positive integers is

(A) 51
(B) 52
(C) 313
(D) 325
(E) 326

27. If $\frac{2x-1}{3} = \frac{12}{9}$, then $x =$

(A) $\frac{3}{2}$
(B) $\frac{5}{2}$
(C) 4
(D) $\frac{13}{2}$
(E) 7



28. What is the perimeter of the pentagon above?

(A) 21
(B) 26
(C) 28
(D) 31
(E) 41

29. If x is positive and y is 1 less than the square of x, which of the following expresses x in terms of y?

(A) $x = y^2 - 1$
(B) $x = y^2 + 1$
(C) $x = \sqrt{y} + 1$
(D) $x = \sqrt{1 - y}$
(E) $x = \sqrt{y + 1}$

30. If the total surface area of a cube is 24, what is the volume of the cube?

(A) 8
(B) 24
(C) 64
(D) $48\sqrt{6}$
(E) 216

SECTION 6
Time—30 minutes
25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1- 4

A gardener will plant eight fruit trees in eight evenly spaced holes dug along a fence line. He has learned the following:

The types of fruit tree that do well in his area are apple, apricot, cherry, peach, pear, and plum. He will make his selection from that group.

Apple, apricot, peach, and pear trees require cross-pollination to bear fruit and must therefore be grown in pairs of a kind, immediately next to each other in the row.

If both plums and peaches are to be planted, each kind will produce more fruit if separated from the other kind by at least three other trees.

The gardener will plant no more than two trees of any one type. He must prepare a plan for planting that will maximize the probability that all of the trees he plants will bear as much fruit as possible.

1. In a plan that meets his requirements, the gardener could plant exactly one of which of the following types of trees?

   (A) Apple
   (B) Apricot
   (C) Peach
   (D) Pear
   (E) Plum

2. If an apple tree is planted in the first hole in the row along the fence, the tree planted in the second hole must be

   (A) an apple tree
   (B) an apricot tree
   (C) a cherry tree
   (D) a plum tree
   (E) a pear tree

3. Which of the following is an acceptable order of trees in the row along the fence?

   (A) Apple, apple, pear, peach, plum, pear, peach, plum
   (B) Apple, apple, pear, pear, apricot, apricot, peach, peach
   (C) Peach, apple, apple, pear, pear, cherry, plum, peach
   (D) Peach, apple, apple, pear, pear, cherry, plum, plum
   (E) Plum, peach, peach, cherry, apple, apple, apple, cherry

4. If the gardener plants a peach tree in the fourth hole in the row along the fence, he could plant a plum tree in which of the following holes?

   (A) The first
   (B) The second
   (C) The third
   (D) The sixth
   (E) The eighth

GO ON TO THE NEXT PAGE.

5. In a recent study on the connection between brain abnormalities and violent behavior, the researcher examined more than three hundred people who had engaged in unusually violent behavior toward friends and family members. In most of the people studied, the researcher found clues of brain abnormalities, including evidence of past brain injury and physical abnormality. The researcher concluded that evidence of brain abnormalities could be used to predict violent behavior.

   Which of the following, if true, would most seriously weaken the researcher's conclusion?

   (A) The incidence of brain abnormalities in the general population is as high as that in the group examined.
   (B) The brain abnormalities discovered in those studied are of two distinct kinds.
   (C) A wide variety of violent actions were exhibited by those studied.
   (D) Those studied in the experiment acted violently toward strangers as well as toward people they knew.
   (E) The study drew its subjects from a large geographical area.

6. Why can human beings outlast many faster four-legged animals when running long distances? Perhaps because early humans evolved as hunters on the hot African savannas. Humans developed the ability to release heat by sweating, but most mammals must pant, a function hard to regulate while running. Also, four-legged animals must adopt a pace that lets them breathe once in mid-stride; otherwise, the impact of the front legs hitting the ground will prevent deep inhalation. Humans can vary the number of breaths per stride, set a pace unsuited to the prey, and so eventually exhaust it.

   The author's explanation of why human beings have evolved as superior distance runners would be most weakened if it were shown that

   (A) early humans typically hunted animals that were less well adapted than humans for long-distance running
   (B) early humans were only one of a number of species that hunted prey on the African savannas
   (C) early humans hunted mainly in groups by sneaking up on prey and trapping it within a circle
   (D) hunting was just as essential for later humans in colder climates as it was for early humans on the African savannas
   (E) human beings of today have retained the ability to run long distances but no longer hunt by chasing prey

7. The government officials of a nation share its citizens' understandings regarding the rules that governments are obligated to honor in their actions. Thus, when a nation deliberately ignores international law, the attitudes of even its government officials will become less favorable toward their government.

   The argument above assumes which of the following?

   (A) People's understandings of governmental obligations change from time to time.
   (B) The citizens of a nation will respond favorably to the nation's attempts to extend its international power by legal means.
   (C) Some officials of totalitarian governments are insensitive to the rules embodied in international law.
   (D) Each nation's citizens believe that international laws are among the rules by which governments ought to operate.
   (E) Elected government officials are more likely to doubt the wisdom of their own government's actions than are appointed government officials.

GO ON TO THE NEXT PAGE.

Questions 8-12

A communications system has exactly four message exchanges, which are called nodes: W, X, Y, and Z. Messages travel from one node directly to another node only as follows:

From W to X, but not vice versa
From W to Y, but not vice versa
From W to Z, and vice versa
From X to Y, and vice versa
From X to Z, but not vice versa
From Z to Y, but not vice versa

A single direct path going in one direction from one node to another is called a leg.

8. If a message is to travel from Y to X over as few legs as possible, it must travel in which of the following ways?

(A) Directly from Y to X
(B) Via W but no other node
(C) Via Z but no other node
(D) Via W and Z, in that order
(E) Via Z and W, in that order

9. Which of the following is a complete and accurate list of nodes to which a message can be sent along exactly one leg from Z ?

(A) W
(B) Y
(C) W, Y
(D) X, Y
(E) W, X, Y

10. Which of the following sequences of legs is a path over which a message could travel from X back to X ?

(A) From X to W, from W to X
(B) From X to Y, from Y to W, from W to Z, from Z to X
(C) From X to Y, from Y to Z, from Z to W, from W to X
(D) From X to Z, from Z to W, from W to Y, from Y to X
(E) From X to Z, from Z to Y, from Y to W, from W to X

11. If all of the legs in the system are equal in length, and if messages always travel along the shortest possible path, then the longest path any message travels in the system is the path from

(A) X to W
(B) Y to W
(C) Y to Z
(D) Z to W
(E) Z to X

12. If certain restricted messages cannot travel any further than one leg, and if an addition of one leg is to be made to the system so that such restricted messages can be sent from each node to at least two others and also be received by each node from at least two others, then that addition must be from

(A) X to W
(B) Y to W
(C) Y to Z
(D) Z to W
(E) Z to X

GO ON TO THE NEXT PAGE.

Questions 13-18

A conductor is distributing musical pieces I, K, L, M, O, and P between two musical ensembles, the Camerata and the Waites. I and K are the most difficult pieces and O and P are the easiest pieces. There will be a single concert in which each ensemble will perform exactly three pieces and no piece will be performed more than once. The ensembles will take turns performing their pieces. The conductor will reward the ensembles for the preparation of the difficult pieces in the following way:

An ensemble that performs I in a concert in which the other performs O is excused from one rehearsal during the week after the concert.

An ensemble that performs K in a concert in which the other performs P is excused from one rehearsal during the week after the concert.

No other excuses from rehearsals will be given.

13. If the Waites performed O, I, and K, which of the following must be true?

(A) The Waites are not excused from any rehearsals.
(B) The Waites are excused from exactly one rehearsal.
(C) The Waites are excused from exactly two rehearsals.
(D) The Camerata are excused from exactly one rehearsal.
(E) The Camerata are excused from exactly two rehearsals.

14. If P and L are among the pieces the Camerata perform, each of the following is possible EXCEPT:

(A) The Waites are not excused from any rehearsals.
(B) The Waites are excused from exactly one rehearsal.
(C) The Waites are excused from exactly two rehearsals.
(D) The Camerata are excused from exactly one rehearsal.
(E) The Camerata are excused from exactly two rehearsals.

15. If each ensemble is excused from exactly one rehearsal, neither ensemble could have performed both

(A) I and P
(B) K and O
(C) L and M
(D) L and P
(E) M and O

16. If, after each ensemble has performed exactly one piece, one ensemble is already assured of being excused from one rehearsal, which of the following could be the four pieces that have not yet been performed?

(A) I, K, L, P
(B) I, L, M, O
(C) I, L, M, P
(D) I, M, O, P
(E) K, L, M, O

17. If I and P are among the pieces the Camerata perform, which of the following must be true?

(A) At least one of the ensembles will be excused from exactly one rehearsal.
(B) At least one of the ensembles will be excused from exactly two rehearsals.
(C) Exactly one ensemble will not be excused from any rehearsals.
(D) Neither ensemble will be excused from any rehearsals.
(E) Neither ensemble will be excused from exactly one rehearsal.

18. If neither ensemble is excused from any rehearsals, which of the following pieces could have been performed by one of the ensembles?

(A) I, K, and P
(B) I, L, and M
(C) I, O, and P
(D) K, M, and O
(E) K, M, and P

GO ON TO THE NEXT PAGE.

Questions 19-22

After an accidental soaking has destroyed the labels on five identical bottles—bottles 1, 2, 3, 4, and 5—containing similar white powders, a pharmacist must determine which of the bottles contain powder P. She knows that exactly two of the bottles contain powder P, but she does not know what any of the remaining three bottles contain. No bottle contains more than one kind of powder. The pharmacist can use only the following tests on samples of the powders:

Test X: Put a sample of powder into solvent S. If powder P is put into solvent S, it will dissolve. Powder P is not the only kind of powder that will dissolve in solvent S.

Test Y: Mix two samples of powder and put the mixture into water. If powder P is mixed with powder Q and then put into water, the water will turn a distinctive shade of blue. The mixture of powders P and Q is the only means of producing this result in water.

The pharmacist has a supply of powder Q, but it is expensive to use in tests.

19. If the pharmacist mixes a sample of powder Q with a sample from bottle 5 and uses test Y on the mixture, the results will show definitely

(A) whether bottle 5 contains powder Q
(B) whether the powder in bottle 5 dissolves in solvent S
(C) that bottle 5 is one of the bottles containing powder P
(D) whether bottle 5 contains powder P
(E) which kind of powder is contained in bottle 5

20. If the pharmacist puts samples from bottles 1 and 2 into solvent S separately and finds that both samples fail to dissolve, she can properly infer that

(A) she has established which two bottles contain powder P
(B) she will establish which two bottles contain powder P if she uses test X on a sample from exactly one more bottle
(C) the results of using test X on a sample from one more bottle might or might not establish which two bottles contain powder P
(D) it is necessary to test samples from exactly two more bottles with test X to establish which two bottles contain powder P
(E) test X must be used on samples from all the bottles in order to establish which two bottles contain powder P

21. If the pharmacist puts a mixture of samples from bottles 3 and 4 into water and gets the shade of blue required in test Y, and then she finds that a sample from bottle 4 does not dissolve in solvent S, she can properly infer that

(A) bottle 3 contains powder P
(B) bottle 3 contains powder Q
(C) bottle 4 contains powder P
(D) neither bottle 3 nor bottle 4 contains powder P
(E) a sample from bottle 3 will not dissolve in solvent S

22. If a mixture of samples from bottles 2 and 3, put into water, fails to produce the shade of blue required in test Y, which of the following is true?

(A) Bottles 2 and 3 could be the ones containing powder P.
(B) It is possible that bottle 3 contains powder P and bottle 2 contains powder Q.
(C) It is impossible to succeed in finding the bottles containing powder P by using test Y alone.
(D) It is impossible to succeed in finding the bottles containing powder P by using test X alone.
(E) Test X alone must be used to find the bottles containing powder P.

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23. The teacher of yoga said that he knows how good the yoga exercises feel and how beneficial they are to his mental and spiritual health. After all, he said, there must be something sound to any human practice that endures more than three thousand years of history.

Which of the following, if true, is the strongest relevant objection to the argument the teacher makes on the basis of the time yoga has endured?

(A) The teacher benefits by the teaching of yoga and so, as a beneficiary, is not a disinterested witness.
(B) The practice of yoga has changed somewhat over three thousand years.
(C) The teacher cites the experience of only one person, whose well-being might be due to other causes.
(D) War, which cannot on balance be called sound, has lasted the length of human history.
(E) Three thousand years is an underestimate of the time period.

GO ON TO THE NEXT PAGE.

24. Researchers compared 42 average-weight and 47 obese infants, aged 7 to 9 months, with respect to current daily nutrient intake, ratio of formula or breast milk to solids in the diet, and maternal reliance on external feeding cues, such as time of day. Mothers completed a three-day food record at home before answering questions on current feeding practices. The researchers concluded from all of these data that, contrary to popular belief, the feeding practices of mothers of obese babies do not contribute significantly to their babies' obesity.

    Which of the following could be an assumption on which the researchers relied in drawing their conclusion?

    (A) Babies over 9 months are less likely to be obese than are babies under 9 months because babies over 9 months eat less frequently than do babies under 9 months.
    (B) In the months before the study, the feeding practices of the mothers in the study did not differ significantly from their feeding practices at the time of the study.
    (C) Babies gain weight at a slower rate between the ages of 7 and 9 months than they do between the ages of 4 and 6 months.
    (D) Obesity is genetically rather than environmentally determined.
    (E) Breast-fed babies are more likely to be obese than are formula-fed babies.

25. Ironically, people who use aspartame as a sweetener to reduce their caloric intake could wind up defeating their purpose, since studies show that high levels of aspartame may trigger a craving for carbohydrates by depleting the brain of a chemical that registers carbohydrate satiety.

    Which of the following conclusions can most properly be drawn if the statements above are true?

    (A) Aspartame can be more hazardous than carbohydrates to people's health.
    (B) People who do not use aspartame are not likely to develop a craving for carbohydrates.
    (C) The caloric content of foods that are high in carbohydrates is significant.
    (D) People tend to prefer sweet foods to those high in carbohydrates.
    (E) Food products that contain aspartame are typically low in carbohydrates.

FOR GENERAL TEST 13 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 1			Section 4		
Number	Answer	P+	Number	Answer	P+
1	D	97	1	E	91
2	C	62	2	C	74
3	D	63	3	C	80
4	C	60	4	C	61
5	A	47	5	D	55
6	E	47	6	D	50
7	D	45	7	C	41
8	C	95	8	A	98
9	B	85	9	D	92
10	D	76	10	E	84
11	C	71	11	E	79
12	D	58	12	C	73
13	B	65	13	A	37
14	D	48	14	B	47
15	E	34	15	A	36
16	B	18	16	D	29
17	A	53	17	B	67
18	E	73	18	D	29
19	B	59	19	B	79
20	B	51	20	D	65
21	E	63	21	E	76
22	E	62	22	A	59
23	C	37	23	E	55
24	E	50	24	C	64
25	C	63	25	A	23
26	C	35	26	B	40
27	B	69	27	B	29
28	C	95	28	B	91
29	E	84	29	C	88
30	E	86	30	A	83
31	B	68	31	B	80
32	A	51	32	C	53
33	B	46	33	C	63
34	A	38	34	A	44
35	A	36	35	E	34
36	D	33	36	D	25
37	D	24	37	E	28
38	E	13	38	A	25

QUANTITATIVE ABILITY					
Section 2			Section 5		
Number	Answer	P+	Number	Answer	P+
1	A	82	1	A	87
2	D	82	2	C	80
3	B	80	3	B	90
4	B	76	4	D	78
5	A	74	5	A	77
6	C	72	6	B	76
7	B	76	7	C	74
8	A	74	8	A	44
9	B	60	9	A	56
10	C	48	10	D	48
11	A	63	11	B	45
12	A	70	12	C	37
13	D	39	13	D	33
14	C	43	14	B	38
15	D	28	15	D	21
16	C	86	16	D	90
17	B	79	17	A	87
18	C	85	18	D	76
19	B	66	19	C	81
20	D	63	20	C	65
21	A	89	21	A	97
22	C	88	22	C	85
23	C	70	23	E	57
24	E	61	24	B	80
25	D	49	25	D	63
26	D	71	26	D	69
27	D	48	27	B	73
28	E	38	28	B	63
29	B	33	29	E	54
30	A	29	30	A	47

ANALYTICAL ABILITY					
Section 3			Section 6		
Number	Answer	P+	Number	Answer	P+
1	B	85	1	E	81
2	D	59	2	A	87
3	A	85	3	B	82
4	D	83	4	E	73
5	C	51	5	A	70
6	E	43	6	C	58
7	E	64	7	D	72
8	B	80	8	A	90
9	C	73	9	C	53
10	E	64	10	D	80
11	C	83	11	B	53
12	B	60	12	B	37
13	C	61	13	B	62
14	D	66	14	E	36
15	C	38	15	C	56
16	A	55	16	B	47
17	D	71	17	A	49
18	E	38	18	E	30
19	A	21	19	D	50
20	D	48	20	C	46
21	E	34	21	A	49
22	E	19	22	A	26
23	B	37	23	D	45
24	D	35	24	B	52
25	A	42	25	C	40

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 13 ONLY AND THE PERCENTS BELOW*

Raw Score	Verbal Scaled Score	Verbal % Below	Quantitative Scaled Score	Quantitative % Below	Analytical Scaled Score	Analytical % Below
74-76	800	99				
73	790	99				
72	780	99				
71	770	99				
70	750	98				
69	740	98				
68	730	97				
67	720	96				
66	710	95				
65	690	94				
64	680	93				
63	670	92				
62	660	90				
61	650	89				
60	640	87	800	97		
59	630	85	790	96		
58	620	84	780	94		
57	610	82	760	92		
56	590	78	750	89		
55	580	76	740	88		
54	570	74	730	86		
53	560	72	720	84		
52	550	69	710	82		
51	540	67	690	78		
50	530	64	680	77	800	99
49	520	61	670	74	800	99
48	520	61	660	72	800	99
47	510	59	650	70	790	98
46	500	56	640	68	770	97
45	490	54	620	63	760	96
44	480	51	610	61	750	96
43	470	48	600	59	730	94
42	460	44	590	57	720	92
41	450	41	580	54	710	91
40	440	38	570	51	700	90
39	430	36	550	48	680	87
38	420	33	540	45	670	85
37	420	33	530	42	660	83
36	410	30	520	40	650	81
35	400	26	510	37	630	76
34	390	24	500	35	620	74
33	380	22	480	30	610	72
32	370	20	470	28	590	67
31	370	20	460	26	580	64
30	360	16	450	24	570	61
29	350	14	440	22	550	55
28	340	12	430	20	540	52
27	340	12	410	16	520	46
26	330	10	400	14	500	40
25	320	9	390	13	490	38
24	310	7	380	12	470	32
23	300	6	370	10	450	27
22	290	5	360	9	440	24
21	280	4	340	6	420	20
20	270	3	330	5	410	18
19	260	2	320	5	390	15
18	250	1	310	4	370	12
17	240	1	300	3	360	10
16	230	1	290	2	340	7
15	220	1	270	2	330	6
14	210	1	260	1	310	4
13	200	1	250	1	290	3
12	200	1	240	1	270	2
11	200	1	230	1	260	1
10	200	1	220	1	240	1
9	200	1	200	1	230	1
8	200	1	200	1	220	1
7	200	1	200	1	210	1
0-6	200	1	200	1	200	1

*Percent scoring below the scaled score is based on the performance of 923,359 examinees who took the General Test between October 1, 1986, and September 30, 1989. This percent below information is used for score reports during the 1990-91 testing year.

TEST 14

SECTION 1

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Psychology has slowly evolved into an ------- scientific discipline that now functions autonomously with the same privileges and responsibilities as other sciences.

   (A) independent (B) unusual
   (C) outmoded (D) uncontrolled
   (E) inactive

2. A major goal of law, to deter potential criminals by punishing wrongdoers, is not served when the penalty is so seldom invoked that it ------- to be a ------- threat.

   (A) tends. . serious
   (B) appears. . real
   (C) ceases. . credible
   (D) fails. . deceptive
   (E) seems. . coercive

3. When people are happy, they tend to give ------- interpretations of events they witness: the eye of the beholder is ------- by the emotions of the beholder.

   (A) charitable. . colored
   (B) elaborate. . disquieted
   (C) conscientious. . deceived
   (D) vague. . sharpened
   (E) coherent. . confused

4. Even those who disagreed with Carmen's views rarely faulted her for expressing them, for the positions she took were as ------- as they were controversial.

   (A) complicated (B) political
   (C) subjective (D) commonplace
   (E) thoughtful

5. New research on technology and public policy focuses on how seemingly ------- design features, generally overlooked in most analyses of public works projects or industrial machinery, actually ------- social choices of profound significance.

   (A) insignificant. . mask
   (B) inexpensive. . produce
   (C) innovative. . represent
   (D) ingenious. . permit
   (E) inopportune. . hasten

6. Paradoxically, Robinson's excessive denials of the worth of early works of science fiction suggest that she has become quite ------- them.

   (A) reflective about (B) enamored of
   (C) skeptical of (D) encouraged by
   (E) offended by

7. Cézanne's delicate watercolor sketches often served as ------- of a subject, a way of gathering fuller knowledge before the artist's final engagement of the subject in an oil painting.

   (A) an abstraction
   (B) an enhancement
   (C) a synthesis
   (D) a reconnaissance
   (E) a transcription

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. HAMMER : CARPENTER ::
   (A) brick : mason (B) road : driver
   (C) kitchen : cook (D) letter : secretary
   (E) knife : butcher

9. EMBRACE : AFFECTION ::
   (A) jeer : sullenness
   (B) glower : ridicule
   (C) frown : displeasure
   (D) cooperation : respect
   (E) flattery : love

10. PLUMMET : FALL :: (A) radiate : glow
    (B) converge : attract (C) flounder : move
    (D) swerve : turn (E) flow : ebb

11. GRAZING : FORAGERS ::
    (A) skipping : readers
    (B) strolling : prisoners
    (C) weeding : gardeners
    (D) stalking : hunters
    (E) resting : pickers

12. TEXT : EXTEMPORIZE ::
    (A) score : improvise
    (B) style : decorate
    (C) exhibit : demonstrate
    (D) diagram : realize
    (E) sketch : outline

13. PERTINENT : RELEVANCE ::
    (A) insistent : rudeness
    (B) benevolent : perfection
    (C) redundant : superfluity
    (D) prevalent : universality
    (E) aberrant : uniqueness

14. ASSERT : BELABOR ::
    (A) tend : fuss (B) refine : temper
    (C) describe : demean (D) resemble : portray
    (E) contaminate : purge

15. TRANSGRESSION : MORALITY ::
    (A) mistake : probity (B) invitation : hospitality
    (C) gift : generosity (D) presumption : propriety
    (E) misconception : curiosity

16. BLOWHARD : BOASTFUL ::
    (A) cynic : perspicacious
    (B) highbrow : grandiloquent
    (C) exhibitionist : embarrassed
    (D) misanthrope : affected
    (E) toady : obsequious

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Ragtime is a musical form that synthesizes folk melodies and musical techniques into a brief quadrille-like structure, designed to be played—exactly as written—on the piano. A strong analogy exists between European composers like Ralph Vaughan Williams, Edvard Grieg, and Anton Dvořák who combined folk tunes and their own original materials in larger compositions and the pioneer ragtime composers in the United States. Composers like Scott Joplin and James Scott were in a sense collectors or musicologists, collecting dance and folk music in Black communities and consciously shaping it into brief suites or anthologies called piano rags.

It has sometimes been charged that ragtime is mechanical. For instance, Wilfred Mellers comments, "rags were transferred to the pianola roll and, even if not played by a machine, should be played like a machine, with meticulous precision." However, there is no reason to assume that ragtime is inherently mechanical simply because commercial manufacturers applied a mechanical recording method to ragtime, the only way to record pianos at that date. Ragtime's is not a mechanical precision, and it is not precision limited to the style of performance. It arises from ragtime's following a well-defined form and obeying simple rules within that form.

The classic formula for the piano rag disposes three to five themes in sixteen-bar strains, often organized with repeats. The rag opens with a bright, memorable strain or theme, followed by a similar theme, leading to a trio of marked lyrical character, with the structure concluded by a lyrical strain that parallels the rhythmic developments of the earlier themes. The aim of the structure is to rise from one theme to another in a stair-step manner, ending on a note of triumph or exhilaration. Typically, each strain is divided into two 8-bar segments that are essentially alike, so the rhythmic-melodic unit of ragtime is only eight bars of 2/4 measure. Therefore, themes must be brief with clear, sharp melodic figures. Not concerned with development of musical themes, the ragtime composer instead sets a theme down intact, in finished form, and links it to various related themes. Tension in ragtime compositions arises from a polarity between two basic ingredients: a continuous bass—called by jazz musicians a boom-chick bass—in the pianist's left hand, and its melodic, syncopated counterpart in the right hand.

Ragtime remains distinct from jazz both as an instrumental style and as a genre. Ragtime style stresses a pattern of repeated rhythms, not the constant inventions and variations of jazz. As a genre, ragtime requires strict attention to structure, not inventiveness or virtuosity. It exists as a tradition, a set of conventions, a body of written scores, separate from the individual players associated with it. In this sense ragtime is more akin to folk music of the nineteenth century than to jazz.

17. Which of the following best describes the main purpose of the passage?

(A) To contrast ragtime music and jazz
(B) To acknowledge and counter significant adverse criticisms of ragtime music
(C) To define ragtime music as an art form and describe its structural characteristics
(D) To review the history of ragtime music and analyze ragtime's effect on listeners
(E) To explore the similarities between ragtime music and certain European musical compositions

18. According to the passage, each of the following is a characteristic of ragtime compositions that follow the classic ragtime formula EXCEPT

(A) syncopation
(B) well-defined melodic figures
(C) rising rhythmic-melodic intensity
(D) full development of musical themes
(E) a bass line distinct from the melodic line

GO ON TO THE NEXT PAGE.

19. According to the passage, Ralph Vaughan Williams, Anton Dvořák, and Scott Joplin are similar in that they all

(A) conducted research into musicological history
(B) wrote original compositions based on folk tunes
(C) collected and recorded abbreviated piano suites
(D) created intricate sonata-like musical structures
(E) explored the relations between Black music and continental folk music

20. The author rejects the argument that ragtime is a mechanical music because that argument

(A) overlooks the precision required of the ragtime player
(B) does not accurately describe the sound of ragtime pianola music
(C) confuses the means of recording and the essential character of the music
(D) exaggerates the influence of the performance style of professional ragtime players on the reputation of the genre
(E) improperly identifies commercial ragtime music with the subtler classic ragtime style

21. It can be inferred that the author of the passage believes that the most important feature of ragtime music is its

(A) commercial success
(B) formal structure
(C) emotional range
(D) improvisational opportunities
(E) role as a forerunner of jazz

22. It can be inferred from the passage that the essential nature of ragtime has been obscured by commentaries based on

(A) the way ragtime music was first recorded
(B) interpretations of ragtime by jazz musicians
(C) the dance fashions that were contemporary with ragtime
(D) early reviewers' accounts of characteristic structure
(E) the musical sources used by Scott Joplin and James Scott

23. Which of the following is most nearly analogous in source and artistic character to a ragtime composition as described in the passage?

(A) Symphonic music derived from complex jazz motifs
(B) An experimental novel based on well-known cartoon characters
(C) A dramatic production in which actors invent scenes and improvise lines
(D) A ballet whose disciplined choreography is based on folk-dance steps
(E) A painting whose abstract shapes evoke familiar objects in a natural landscape

GO ON TO THE NEXT PAGE.

Echolocating bats emit sounds in patterns—characteristic of each species—that contain both frequency-modulated (FM) and constant-frequency (CF) signals. The broadband FM signals and the narrowband CF signals travel out to a target, reflect from it, and return to the hunting bat. In this process of transmission and reflection, the sounds are changed, and the changes in the echoes enable the bat to perceive features of the target.

The FM signals report information about target characteristics that modify the timing and the fine frequency structure, or spectrum, of echoes—for example, the target's size, shape, texture, surface structure, and direction in space. Because of their narrow bandwidth, CF signals portray only the target's presence and, in the case of some bat species, its motion relative to the bat's. Responding to changes in the CF echo's frequency, bats of some species correct in flight for the direction and velocity of their moving prey.

24. According to the passage, the information provided to the bat by CF echoes differs from that provided by FM echoes in which of the following ways?

(A) Only CF echoes alert the bat to moving targets.
(B) Only CF echoes identify the range of widely spaced targets.
(C) Only CF echoes report the target's presence to the bat.
(D) In some species, CF echoes enable the bat to judge whether it is closing in on its target.
(E) In some species, CF echoes enable the bat to discriminate the size of its target and the direction in which the target is moving.

25. According to the passage, the configuration of the target is reported to the echolocating bat by changes in the

(A) echo spectrum of CF signals
(B) echo spectrum of FM signals
(C) direction and velocity of the FM echoes
(D) delay between transmission and reflection of the CF signals
(E) relative frequencies of the FM and the CF echoes

26. The author presents the information concerning bat sonar in a manner that could be best described as

(A) argumentative (B) commendatory (C) critical (D) disbelieving (E) objective

27. Which of the following best describes the organization of the passage?

(A) A fact is stated, a process is outlined, and specific details of the process are described.
(B) A fact is stated, and examples suggesting that a distinction needs correction are considered.
(C) A fact is stated, a theory is presented to explain that fact, and additional facts are introduced to validate the theory.
(D) A fact is stated, and two theories are compared in light of their explanations of this fact.
(E) A fact is stated, a process is described, and examples of still another process are illustrated in detail.

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. CONSTRAIN: (A) release (B) sever (C) abandon (D) unload (E) agree

29. SQUAT: (A) dim and dark (B) tall and thin (C) misty and vague (D) sharp and shrill (E) flat and narrow

30. OPAQUENESS: (A) opalescence (B) clarity (C) density (D) magnetism (E) latency

31. COMELINESS:
(A) disagreement
(B) humiliation
(C) ambition
(D) unattractiveness
(E) shortsightedness

32. PROFUNDITY: (A) speciousness (B) solicitude (C) succinctness (D) superficiality (E) solidarity

33. BURGEON: (A) subside (B) esteem (C) placate (D) tempt (E) wean

34. SINEWY: (A) new (B) weak (C) corrupt (D) subtle (E) substantial

35. EXHAUSTIVE: (A) incomplete (B) energetic (C) strong (D) indecisive (E) conserving

36. PINE: (A) fall apart (B) become invigorated (C) become enraged (D) move ahead (E) stand firm

37. OBSTINACY: (A) persuasiveness (B) tractability (C) antipathy (D) neutrality (E) magnanimity

38. EXACT: (A) deny (B) judge (C) deprive (D) forgive (E) establish

SECTION 2

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

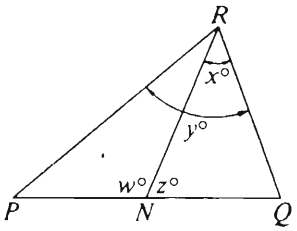
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

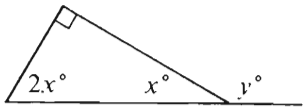
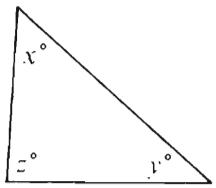


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

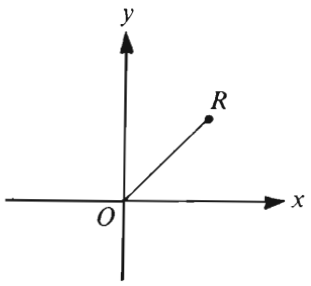
	Column A	Column B
1.	The average (arithmetic mean) of 15, 16, and 180	The average (arithmetic mean) of 57, 58, and 60
	$x + 3 = 23$ $24 - y = 3$	
2.	x	y
	12 is $\frac{2}{3}$ of n.	
3.	$2n$	16
4.	$11 + (-12) + 13 + (-14)$	$2(-1)$
5.	The cost per gram of carrots if 3 cans of carrots cost \$0.90	The cost per gram of onions if 5 cans of onions cost \$1.50
6.	$8 + \left(6 \cdot \frac{1}{14}\right)$	$8 + \frac{3}{7}$
7.	$\frac{6}{7}$	$\frac{5}{6}$
	$r > 0$	
8.	The area of a square region with side r	The area of a circular region with radius r

	Column A	Column B
	$\frac{1}{x} = 3$	
9.	x	1
		
10.	y	120
	A certain car gets 24 miles per gallon of gasoline for city driving, which is 60 percent of the number of miles per gallon of gasoline the car gets for highway driving.	
11.	The number of gallons of gasoline used to drive this car 30 miles in the city	The number of gallons of gasoline used to drive this car 45 miles on the highway
		
12.	$x + y$	z

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
13.	The x-coordinate of point R	5

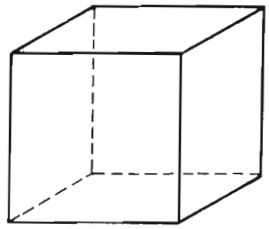


R is a point in the rectangular coordinate system and $OR = 5$.

$x > 0$
$n > 0$

	Column A	Column B
14.	$\frac{x^n}{x^{n+1}}$	$\frac{x^{n+1}}{x^n}$

	Column A	Column B
15.	The length of an edge	6 meters



The volume of the cube is x cubic meters and the surface area is x square meters.

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Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

---

16. $\dfrac{(12)(27) - (27)(5)}{12 - 5} =$

(A) 0 (B) 1 (C) $\frac{60}{7}$ (D) 27 (E) 189

7	8	9	10	11
16	15	14	13	12
17	18	19	20	21
26	25	24	23	22
27	28	29	30	31

17. The figure above consists of 25 squares. If the figure were folded along the dotted diagonal to form a flat triangle, then 26 minus the number in the square that would coincide with the square containing 26 would be

(A) 13 (B) 14 (C) 15 (D) 16 (E) 17

18. If $D = (S - W)T$ and $D \neq 0$, then $S =$

(A) $W - \frac{T}{D}$

(B) $\frac{D}{T} + W$

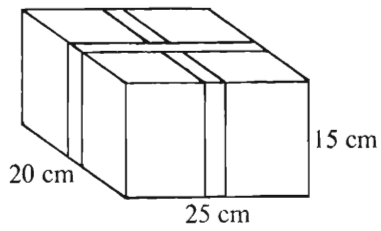
(C) $DT - W$

(D) $DT + W$

(E) $D + WT$

19. The selling price of a certain book is \$12.00. For each copy of the book sold, the author receives \$2.40. What percent of the selling price does the author receive?

(A) 20% (B) 5% (C) 2%
(D) 0.5% (E) 0.2%



20. The rectangular box shown above has been wrapped with two tapes, each going once around the box without overlap and running parallel to the edges of the box. How many centimeters of tape were used on the box?

(A) 70 (B) 80 (C) 120 (D) 140 (E) 150

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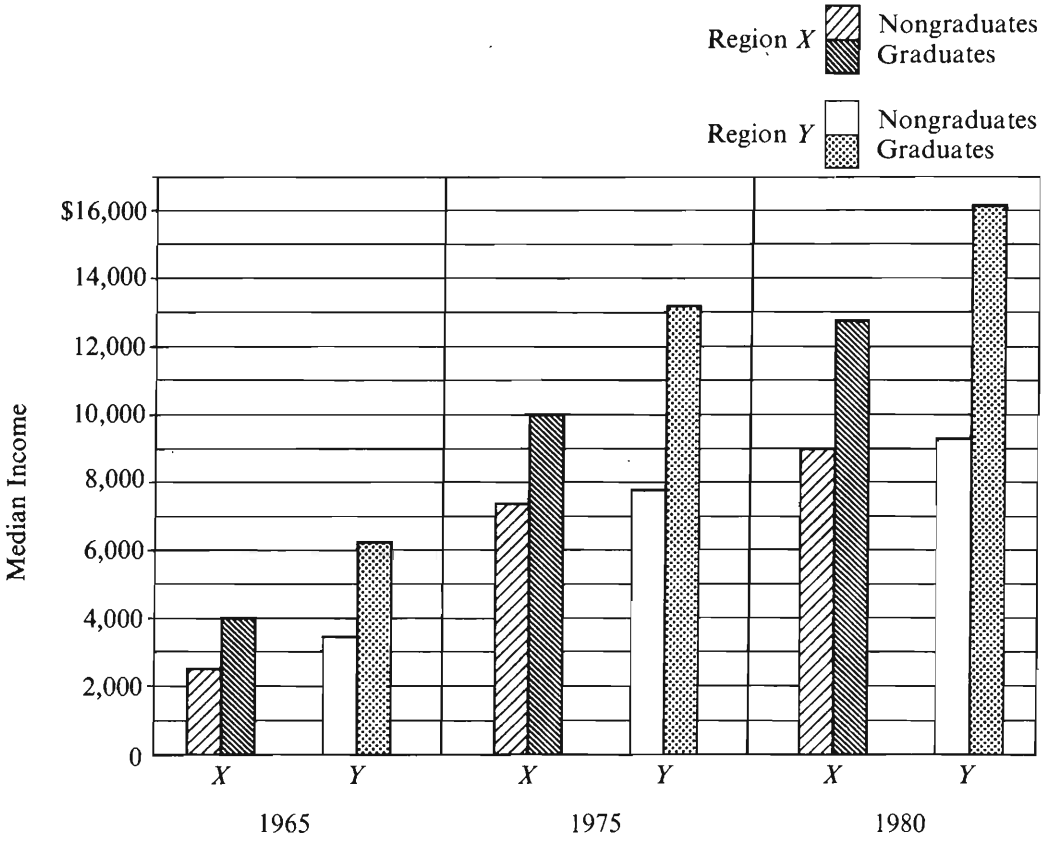
Questions 21-25 refer to the following graph.

MEDIAN INCOME OF
COLLEGE GRADUATES *VS.* NONGRADUATES
IN REGIONS *X* AND *Y*



Note: Graph drawn to scale.

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21. The median income of graduates in Region X in 1980 was most nearly equal to the median income of

(A) graduates in Region X in 1975
(B) graduates in Region Y in 1975
(C) graduates in Region Y in 1980
(D) nongraduates in Region X in 1980
(E) nongraduates in Region Y in 1980

22. For nongraduates in Region X, the median income in 1980 was approximately how many times as great as it was in 1965 ?

(A) 2 (B) 2.5 (C) 3 (D) 3.5 (E) 5

23. Of the following 1980 median-income ratios, the greatest was the ratio of the median incomes of

(A) graduates in Region Y to graduates in Region X
(B) nongraduates in Region Y to nongraduates in Region X
(C) graduates in Region Y to nongraduates in Region Y
(D) graduates in Region X to nongraduates in Region X
(E) graduates in Region X to nongraduates in Region Y

24. From 1965 to 1975 in Region X, the increase in the median income of graduates was how much more than that of nongraduates?

(A) \$5,000
(B) \$3,000
(C) \$2,500
(D) \$2,000
(E) \$1,000

25. For how many of the four categories given did the median income increase by at least 30 percent from 1975 to 1980 ?

(A) None
(B) One
(C) Two
(D) Three
(E) Four

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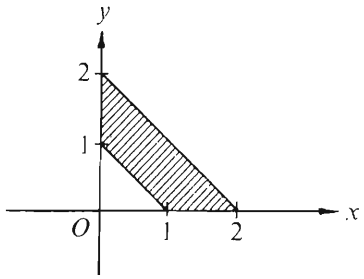
26. Which of the following indicates all x such that $x^2 < x$?

(A) $-1 < x < 0$
(B) $-1 < x < 1$
(C) $0 < x < 1$
(D) $x < 0$
(E) $x > 1$

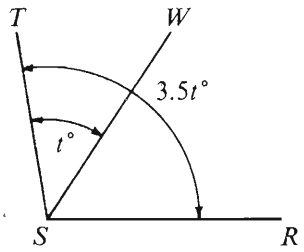


27. In the rectangular coordinate system above, the area of the shaded region is

(A) $1\frac{1}{2}$ (B) 2 (C) $2\frac{1}{2}$ (D) 3 (E) 4

28. Which of the following equals $x + xy + (x + xy)y$?

(A) $x(1 + y)^2$
(B) $x(2 + y + y^2)$
(C) $2x(1 + y) + y$
(D) $2xy(1 + y)$
(E) $x^2(1 + y^2)y$



29. If $t = 40$, what is the degree measure of $\angle WSR$?

(A) 140 (B) 120 (C) 110 (D) 100 (E) 80

30. What is the distance between two points on a number line if the coordinates of the points are $4 + \sqrt{5}$ and $2 - \sqrt{5}$?

(A) $2 - 2\sqrt{5}$
(B) $2 + 2\sqrt{5}$
(C) $6 + 2\sqrt{5}$
(D) 2
(E) 6

SECTION 3

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-6

A team of art historians has the task of determining approximately when certain recently discovered illustrated manuscripts, each the work of a different artist, were created. The art historians consult a chemist who will test for the presence of six pigments on the manuscripts. It is known when these pigments were first manufactured and when, in some cases, they stopped being manufactured and used, as listed below:

Pigment 1: introduced A.D. 1100; stopped being used A.D. 1300.
Pigment 2: introduced A.D. 1250.
Pigment 3: introduced A.D. 1300.
Pigment 4: introduced A.D. 1000; stopped being used A.D. 1250.
Pigment 5: introduced A.D. 1200; stopped being used A.D. 1400.
Pigment 6: introduced A.D. 1350.

1. Which of the following pigments could NOT have been used together in the creation of a manuscript?

(A) 1 and 5
(B) 1 and 6
(C) 2 and 3
(D) 2 and 5
(E) 2 and 6

2. A manuscript illustrated with pigments 1 and 2 must have been created between

(A) A.D. 1050 and A.D. 1100
(B) A.D. 1100 and A.D. 1150
(C) A.D. 1150 and A.D. 1200
(D) A.D. 1200 and A.D. 1250
(E) A.D. 1250 and A.D. 1300

3. The earliest possible date of creation of a manuscript that is illustrated with pigments 1 and 4 is

(A) A.D. 1000
(B) A.D. 1050
(C) A.D. 1100
(D) A.D. 1150
(E) A.D. 1200

4. The team could determine to within a fifty-year period the date of creation of a manuscript that was created with which of the following combinations of pigments?

(A) 2 and 3
(B) 2 and 5
(C) 2 and 6
(D) 3 and 5
(E) 5 and 6

5. How many of the other five pigments could have been used in the creation of a manuscript illustrated with pigment 6?

(A) One
(B) Two
(C) Three
(D) Four
(E) Five

6. No further tests are performed on a certain manuscript after two of the pigments are identified, because no additional information in regard to dating would be gained. Which of the following could be the two identified pigments?

(A) 1 and 4
(B) 2 and 3
(C) 2 and 6
(D) 3 and 5
(E) 5 and 6

GO ON TO THE NEXT PAGE.

7. In a study of more than 8,000 people using ten beaches on two of the Great Lakes, ecologists from the University of Toronto determined that the rate of respiratory and gastrointestinal illness among people who had been swimming was 69.6 per 1,000, whereas the respiratory and gastrointestinal illness rate among those who had not been swimming was only 29.5 per 1,000.

   Which of the following conclusions can be most properly drawn from the data above?

   (A) People tend to underestimate the risks of swimming in these lakes.
   (B) Respiratory and gastrointestinal illnesses occur at a higher rate as a result of swimming in either of these lakes than they do as a result of swimming in any other lake.
   (C) Illnesses of kinds other than respiratory and gastrointestinal are not likely to be associated with swimming in either of these lakes.
   (D) The association between swimming in these lakes and respiratory and gastrointestinal illness is some evidence for a causal relationship between them.
   (E) A large percentage of the people who swim in these lakes are immune to the diseases that swimming may cause.

8. The story of Robinson Crusoe's adventures on an uninhabited island is no longer as popular as it once was, nor does it inspire modern versions in popular fiction. This change in the reading public's taste has occurred because it is no longer easy to believe that undiscovered, uninhabited islands still exist.

   The author's reasoning about the decreased popularity of Robinson Crusoe-like adventures in popular fiction is based on which of the following assumptions?

   (A) Readers of popular fiction no longer wish to exchange their current lives for lives freed from the demands made on them by other people.
   (B) Readers of popular fiction prefer settings that they can readily accept as plausible contemporary settings.
   (C) The most satisfying type of popular fiction is that which enables the reader to participate vicariously in another person's adventures.
   (D) As a result of media coverage, more people are acquainted with foreign locales today than at any time in the past.
   (E) Readers of popular fiction are found among people with diverse interests, with the result that no single type of fiction appeals to all.

9. Substances suspected of causing cancer, if carefully administered to experimental animals in quantities in which those substances are ordinarily present in the environment, are virtually guaranteed not to produce cancer at rates significantly above the chance level. The most economical procedure for obtaining informative data is to administer vastly increased amounts of the substance being tested.

   The 'economical procedure' described above will not be an effective one if which of the following is true?

   (A) Cancer data on experimental animals yield accurate estimates of the risk of cancer for human beings.
   (B) Experimental animals will often develop cancer in response to receiving excessive quantities of a substance, regardless of the specific properties of the substance.
   (C) When more of a possibly cancer-causing substance is administered to experimental animals, fewer animals are needed for significant data to be obtained.
   (D) Among experimental animals, the chance level for many types of cancer is virtually zero.
   (E) Substances will often be tested in amounts greater than necessary to obtain informative data.

GO ON TO THE NEXT PAGE.

Questions 10-16

An observatory is setting up a schedule for schoolchildren to view a returning comet. Five school classes—K, L, N, O, and P—will each view the comet exactly once during the four nights, Monday through Thursday, of its maximum brightness. Excellent viewing conditions are predicted for all four nights. The scheduling is subject to the following constraints:

At most two classes can view the comet on any given night.
Class K cannot view the comet on the same night that Class N does.
Class L must view the comet on a night prior to the night when Class P views the comet.
Class O must view the comet on the same night that Class P does.

10. Which of the following is a possible schedule for viewing the comet?

	Monday	Tuesday	Wednesday	Thursday
(A)	N	K, L	O, P	---
(B)	L, N	---	K, O, P	---
(C)	L	K, N	---	O, P
(D)	K	O, P	L	N
(E)	K	L, N	O	P

11. If Class L views the comet on Wednesday, which of the following must be true?

(A) Class K views the comet on Monday.
(B) Class K views the comet on Wednesday.
(C) Class N views the comet on Tuesday.
(D) Class O views the comet on Thursday.
(E) Class P views the comet on Monday.

12. If Class O can view the comet neither on Wednesday nor on Thursday, which of the following must be true?

(A) Class K views the comet on Monday.
(B) Class L views the comet on Monday.
(C) Class L views the comet on Tuesday.
(D) Class N views the comet on Wednesday.
(E) Class N views the comet on Thursday.

13. If Class N views the comet on Thursday, which of the following could be true?

(A) Class P views the comet on Tuesday.
(B) Class O views the comet on Thursday.
(C) Class L views the comet on Thursday.
(D) Class L views the comet on Wednesday.
(E) Class K views the comet on Thursday.

14. Which of the following must be true of any viewing schedule?

(A) Class K views the comet on a night prior to the night Class O views it.
(B) Class N views the comet on a night prior to the night Class P views it.
(C) There is at most one night when no class views the comet.
(D) There is exactly one night when no class views the comet.
(E) At least one class views the comet on each of the four nights.

15. Each of the following could be true EXCEPT:

(A) Class L views the comet on Monday.
(B) Class N views the comet on Wednesday.
(C) Class O views the comet on Tuesday.
(D) Class L and Class N view the comet on Tuesday.
(E) Class N and Class P view the comet on Thursday.

16. If classes K, L, and N have each been scheduled for a different night, which of the following must be true?

(A) One of the three views the comet on Monday.
(B) One of the three views the comet on Thursday.
(C) Class K views the comet on a night prior to the night when Class N views it.
(D) Class L views the comet on a night prior to the night when Class K views it.
(E) Class N views the comet on a night prior to the night when Class O views it.

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Questions 17-22

A certain dance involves three couples: L1 and P1, L2 and P2, L3 and P3. Each couple consists of a leader (the L's) and a partner (the P's). The dance begins with the following original configuration:

The L's are in a line:	L1 L2 L3
The P's are facing their respective L's	P1 P2 P3

The dance consists of any one of a variety of sequences of moves. The four possible moves—two of them exchanges and two of them findings—are listed below. No dancers except those listed in a move description change position during that move.

Exchanges:

There is an immediate exchange (IE), in which L1 takes whatever place L2 currently occupies; L2 takes whatever place L3 currently occupies; L3 takes whatever place L1 currently occupies.

There is a remote exchange (RE), in which L1 and L3 exchange their current places.

Findings:

There is "find your leader" (FL), in which P's move so as to be opposite to the L's they faced at the beginning of the dance.

There is "find your partner" (FP), in which L's move so as to be opposite to the P's they faced at the beginning of the dance.

Two consecutive exchanges cannot be immediately followed by a third exchange.

If, in a configuration, each leader faces his or her original partner, the next move cannot be a finding.

17. Which of the following is an admissible initial sequence of moves?

(A) FL, RE, IE, FL, FP
(B) RE, IE, IE, FP, RE
(C) IE, FL, IE, FL, FL
(D) RE, FL, IE, RE, IE
(E) RE, IE, FL, IE, RE

18. If the first move in the dance is RE, followed by FL, which of the following will be the configuration after those two moves?

(A) L1 L2 L3
P1 P2 P3
(B) L2 L1 L3
P1 P2 P3
(C) L3 L2 L1
P3 P2 P1
(D) L1 L3 L2
P1 P2 P3
(E) L3 L1 L2
P1 P2 P3

19. If the configuration is L2 L1 L3, which of the P2 P1 P3 following lines of leaders is possible after exactly one additional move?

(A) L1 L2 L3
(B) L2 L1 L3
(C) L2 L3 L1
(D) L3 L1 L2
(E) L3 L2 L1

20. If, starting from the original configuration, the dancers have performed exactly two moves, both exchanges, but of different types, which of the following could be the resulting configuration?

(A) L3 L1 L2
P1 P2 P3
(B) L1 L3 L2
P1 P3 P2
(C) L3 L2 L1
P1 P2 P3
(D) L1 L3 L2
P1 P2 P3
(E) L3 L2 L1
P3 P2 P1

21. If the dancers start from the original configuration, which of the following moves or sequences of moves will result in a configuration of L2 L1 L3 ? P2 P1 P3

(A) RE
(B) IE
(C) RE, IE
(D) IE, FL
(E) RE, IE, FL

22. If the dance begins with IE followed by FL, which of the following moves or sequences of moves will result in the dancers' returning to the original configuration?

(A) RE
(B) IE
(C) IE, IE
(D) RE, FL
(E) IE, IE, FL

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Questions 23-24

How does a building contractor most readily prove compliance with the building codes governing new construction? By using those established technologies that the authors of the codes had in mind when setting specifications. This, unfortunately, means that there will never be any significant technological innovation within the industry.

23. The argument above depends on the assumption that, in choosing the technologies to use in new construction, building contractors

(A) are always more concerned to avoid difficulties in proving compliance with the relevant codes than to be innovative
(B) are always concerned to exceed the official specifications by a wide margin in order to forestall challenges
(C) pay little or no attention to the total construction costs entailed by different technologies
(D) consult directly with the authors of the relevant codes in order to avoid using an unproven technology
(E) are able to foresee any changes the relevant codes may undergo before the completion of a new project

24. Which of the following, if true, casts the most serious doubt on the conclusion above?

(A) Among the authors of codes governing new construction are people who were formerly building contractors.
(B) The authors of codes governing new construction are under pressure to set rigorous specifications.
(C) What are now regarded as established technologies were once so innovative that the authors of the codes then applicable could not have foreseen them.
(D) Noncompliance with the codes governing new construction can prove extremely costly to the building contractor in charge of the project.
(E) The established technologies of one country's building industry can be very different from those of another's.

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* 25. X: When a rare but serious industrial accident occurs, people respond by believing that such accidents are becoming more frequent. This belief is irrational. After all, being dealt four aces in a hand of poker, a rare event, hardly increases one's chances of being dealt four aces in a future hand.

Y: To the contrary, the belief is rational because it results in people's sensing a danger to themselves not previously sensed and taking precautionary actions to prevent similar accidents in the future.

Y's attempt to counter X's claim is best described by which of the following?

(A) It questions the aptness of the analogy drawn by X.
(B) It makes apparent X's failure to consider how people vary in their responses to a serious accident.
(C) It shifts the basis for judging rationality to considerations of utility.
(D) It offers an alternative explanation of why people form incorrect beliefs.
(E) It challenges X's assumption that the occurrence of a single event is sufficient to change a belief.

SECTION 4

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-4

A manager who has exactly four projects—F, G, H, and I—to undertake in a given month has made the following determinations:

F has priority over G.
H has priority over I.
If one project has priority over another, the project with priority must be started earlier than the other one.

1. Given only the determinations above, each of the following is a possible sequence in which the four projects could be started EXCEPT

(A) F, G, H, I
(B) F, H, G, I
(C) F, H, I, G
(D) H, F, I, G
(E) H, G, F, I

2. If each of the projects takes equally long to complete, it must be true that

(A) F is completed before H is completed
(B) F is completed before I is completed
(C) G is completed before H is completed
(D) H is completed before G is completed
(E) H is completed before I is completed

3. There would be exactly one order in which the four projects would have to be started if it were determined that

(A) F has priority over H
(B) F has priority over I
(C) H has priority over G
(D) I has priority over F
(E) I has priority over G

4. Which of the following pairs of additional determinations would NOT conflict with the priorities initially determined?

(A) F has priority over H, and I has priority over F.
(B) F has priority over I, and H has priority over G.
(C) G has priority over H, and H has priority over F.
(D) G has priority over H, and I has priority over F.
(E) G has priority over I, and I has priority over F.

5. Employee Complaint: There are not enough parking spaces in the employee parking lot to accommodate all the people who work here.

Employer's Response: There is no truth to the complaint. No one who gets to work on time has trouble finding a parking space. Only if you are late to work are you unlikely to be able to find a space.

Which of the following, if true, gives the reason why the employer's response fails to address the substance of the issue raised in the complaint?

(A) Each employee does not drive his or her own car to work.
(B) The employer is not obligated to provide parking spaces for all employees.
(C) On days when all employees arrived at work on time, there would be insufficient parking spaces.
(D) On days when a large number of employees were late to work, many of the latecomers would be able to find parking spaces.
(E) The number of employees who come to work each day is not always the same.

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6. A novel by the deceased author Virginia Woolf that, in its manuscript form, was 48 chapters long and contained 200,000 words is being edited and reduced to 30 chapters and 70,000 words. Every word in the book will be Woolf's own, and the chapters will appear in the order in which she wrote them. The published result will therefore be an authentic Virginia Woolf novel.

   The claim that the new work is an authentic Virginia Woolf novel will be most damaged if which of the following is true?

   (A) A portion of the manuscript material that editors omitted from the published novel is almost identical to material that Virginia Woolf published in a nonfiction book during her lifetime.
   (B) Critics have argued that Virginia Woolf's writing style in the period during which she wrote this manuscript sometimes lacks conciseness.
   (C) An authentic novel is characterized by its author's decisions about what should be included in it and what sort of emphasis should be given to what is included.
   (D) An authentic novel contains dialogue, characterization, and narrative structures that are recognizably like those found in the author's other major writings, if such writings exist.
   (E) Not many of the novels that Virginia Woolf published during her lifetime contain as few as 70,000 words.

7. I. Neither Carol nor Eric will travel by air.
   II. Neither Carol nor Eric will travel to Burgundia.

   Statement II must be true if both Statement I and which of the following statements are true?

   (A) Immigration officials do not allow travelers without valid visas to enter Burgundia.
   (B) The cost of travel to Burgundia other than by air is almost prohibitive.
   (C) Until recently, Burgundia was closed to foreign visitors.
   (D) It is equally possible to reach Burgundia by commercial as by private airplane.
   (E) It is impossible to reach Burgundia except by air.

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Questions 8-12

A playwright is creating a play with a cast of exactly seven: four female characters—Penelope, Tanya, Vanessa, and Zelda—and three male characters—Marlon, Rex, and Sterling. The playwright has decided that, during each scene of act one, there will always be a balance of characters according to gender, with either one woman and one man, or two women and two men on stage. The playwright will also observe the following restrictions in act one:

At most four characters can be on stage during any one scene.
Characters who are on stage at the start of a scene cannot leave during that scene, and no new characters can enter the stage during that scene.
No character can be on stage for two or more consecutive scenes.
Rex cannot be on stage at the same time as Sterling.
If either Vanessa or Marlon is on stage, the other must be on stage at the same time.
Tanya and Sterling must be on stage during scene 1.

8. If four characters are on stage during scene 1, which of the following must be included among them?

(A) Penelope and Marlon
(B) Penelope and Rex
(C) Vanessa and Marlon
(D) Vanessa and Rex
(E) Zelda and Marlon

9. If four characters are on stage during scene 1, which of the following must be one of the characters on stage during scene 2 ?

(A) Penelope (B) Rex (C) Sterling
(D) Tanya (E) Zelda

10. If Tanya and Vanessa are both on stage during scene 4, each of the following could be on stage during scene 5 EXCEPT

(A) Marlon (B) Penelope (C) Rex
(D) Sterling (E) Zelda

11. Which of the following is the minimum number of scenes the playwright must write for act one if each of the seven characters is to be on stage in at least one scene during act one?

(A) Two (B) Three (C) Four
(D) Five (E) Six

12. If each of act one's first three scenes has only two characters in it and no character is on stage for the second time until scene 4, which of the following can be on stage for the first time in scene 4 of act one?

(A) Marlon (B) Rex (C) Sterling
(D) Vanessa (E) Zelda

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Questions 13-16

The owner of a computer store is planning a window display of five products. Three are to be hardware items selected from K, L, M, N, and O, and two are to be software manuals selected from R, S, T, and U. The display items are to be selected according to the following conditions:

If K is displayed, U must be displayed.
M cannot be displayed unless both L and R are also displayed.
If N is displayed, O must be displayed, and if O is displayed, N must be displayed.
If S is displayed, neither T nor U can be displayed.

13. Which of the following is an acceptable display?

(A) K, L, M, R, U
(B) K, M, N, O, R
(C) L, M, O, R, S
(D) M, N, O, T, U
(E) N, O, R, S, T

14. If K and T are the first two display items to be selected, how many acceptable groups of items are there that would complete the display?

(A) 1
(B) 2
(C) 3
(D) 4
(E) 5

15. If T and U are displayed, which of the following must also be displayed?

(A) K
(B) L
(C) M
(D) N
(E) R

16. If N and O are not displayed, all of the following must be displayed EXCEPT

(A) K
(B) M
(C) R
(D) T
(E) U

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Questions 17-22

Historians have established that a particular copy of a rare jazz recording was sold each year on New Year's Day for seven consecutive years, starting in 1931 and ending in 1937. Each person who bought that copy of the record owned it only during that period and owned it for exactly a year. The seven owners of that copy of the record during this period were Javitz, Kallers, Luria, Mapp, Nakamura, Oster, and Pugh. The following are all the additional facts the historians have discovered about the ownership of that copy of the record during the period 1931-1937:

Luria sold it to Oster.
Pugh sold it to Mapp.
Javitz owned it before Oster owned it.
Nakamura owned it before Luria owned it.

17. Which of the following could be true of that copy of the jazz record during the period 1931-1937 ?

(A) Javitz sold it to Oster.
(B) Luria sold it to Mapp.
(C) Nakamura sold it to Luria.
(D) Oster sold it to Nakamura.
(E) Pugh sold it to Luria.

18. Which of the following must be true of that copy of the jazz record during the period 1931-1937 ?

(A) Javitz owned it before Luria owned it.
(B) Luria owned it before Pugh owned it.
(C) Mapp owned it before Pugh owned it.
(D) Nakamura owned it before Mapp owned it.
(E) Pugh owned it before Nakamura owned it.

19. Which of the following could have sold that copy of the jazz record to Javitz on New Year's Day, 1932 ?

(A) Luria (B) Mapp (C) Nakamura
(D) Oster (E) Pugh

20. Which of the following must have owned that copy of the jazz record before New Year's Day, 1936 ?

(A) Javitz (B) Kallers (C) Luria
(D) Mapp (E) Pugh

21. If Kallers owned that copy of the jazz record during 1933 and sold it to Luria on New Year's Day in 1934, Mapp must have bought it on New Year's Day in which of the following years?

(A) 1931 (B) 1932 (C) 1935
(D) 1936 (E) 1937

22. If Oster owned that copy of the jazz record during 1937, any one of the following could have owned it during 1935 EXCEPT

(A) Javitz (B) Kallers (C) Mapp
(D) Nakamura (E) Pugh

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23. A dog hears higher pitches than a human hears; a cat has a greater capacity to see in dim light than a human normally has; a platypus picks up weak electric signals to which a human is normally insensitive.

Which of the following conclusions can be properly drawn from the statements above?

(A) Most animals have sensory capacities superior to those demonstrated by humans.
(B) Some animals have sensory capacities that are different from those of humans.
(C) During evolution the eyes and ears of human beings were modified to make human sense perception less acute.
(D) Researchers should not be surprised to find that all the sensory capacities of platypuses are greater than any of those demonstrated by humans.
(E) Any human who can see in dim light does so less well than any cat.

24. In the early 1970's, when art reached its current high levels of popularity and value, a rash of thefts of works by great artists occurred in major art museums around the world. But, after 1975, sophisticated new security systems were installed in every major museum. As a consequence, important thefts in major museums declined markedly.

Which of the following, if true, is strongest if offered as part of the evidence to show that improved security systems were responsible for the decline in thefts of important works from major museums?

(A) The typical art work stolen during both the 1970's and the 1980's was a small piece that could be concealed on the person of the thief.
(B) Premiums paid by major museums to insure their most important works of art increased considerably between 1975 and 1985.
(C) The prices paid to art thieves for stolen works were lower during the 1980's than the prices paid to art thieves for comparable works during the 1970's.
(D) Thefts from private collections and smaller galleries of works by great artists increased sharply starting in the late 1970's.
(E) Art thefts in Europe, which has the largest number of works by great artists, outnumbered art thefts in the United States during the 1980's.

25. The government's recent policy of reducing payments to hospitals and physicians will, in the long run, actually cost the public more. Every dollar saved by initially providing lower-quality services eventually leads to several dollars spent in caring for subsequent complications.

Which of the following best serves as an assumption that would make the argument above logically correct?

(A) The government is more concerned about limiting its costs than about the well-being of its citizens.
(B) The government will be unwilling to pay for the complications that arise from providing inadequate health care.
(C) The government believes that the provision of lower-quality services need not result in an increase in complications.
(D) Hospitals and physicians will respond to reduced payments by reducing the quality of care they give.
(E) Hospitals and physicians are paid too much money for the services they provide to the public.

SECTION 5

Time — 30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

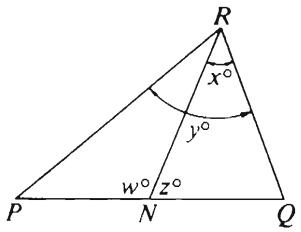
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	$(7 \times 20) + (7 \times 4)$	$(7 \times 25) - 1$

$$\frac{4}{1.2} = \frac{n}{0.9}$$

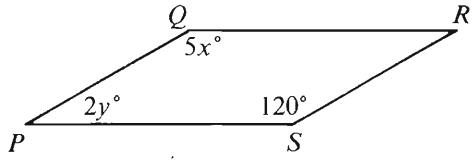
2.	n	3.7
3.	$\frac{2}{3} + \frac{2}{3}$	$\left(\frac{2}{3}\right)\left(\frac{2}{3}\right)$

$$x = y$$
$$y = z$$

4.	$x + 1$	$z - 1$

If checks of \$455 and x dollars are deducted from a checking account that has a balance of \$800, then \$305 of the balance will be left.

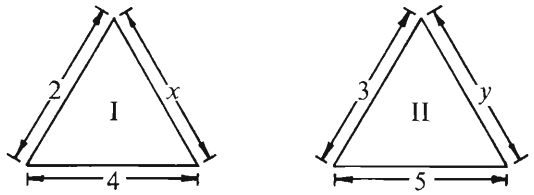
5.	x	45



$PQRS$ is a parallelogram.

6.	x	y

	Column A	Column B
	$n > 0$	
7.	$\frac{n^2 + 2}{n}$	$n + \frac{1}{n}$



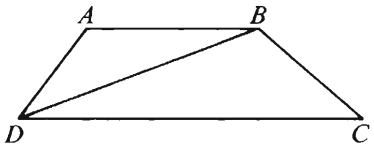
The perimeter of triangle I equals the perimeter of triangle II.

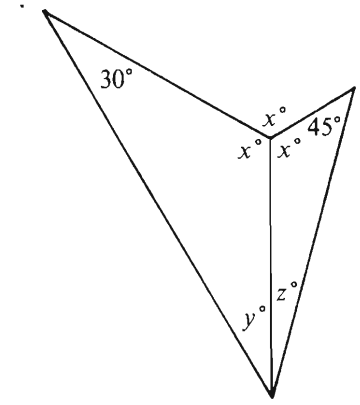
8.	x	y

9.	The number of minutes in y weeks	The number of hours in $60y$ weeks

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
10.	 $AB \parallel DC$ and $DC > AB$. Area of triangular region ABD / Area of triangular region DBC	$\frac{1}{2}$
11.	The ratio of the circumference to the diameter of a circle that has radius 6	The ratio of the circumference to the diameter of a circle that has radius 6.5
12.	8^6	4^9

	Column A	Column B
13.	 z	20
14.	$\frac{x^m}{x^3}$	$x^{\frac{m}{3}}$
15.	The greatest prime factor of $(2^4)^2 - 1$	17

GO ON TO THE NEXT PAGE

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

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16. A certain writer noted that, on the average, 3 pages of a manuscript were equivalent to 1 page of the published book. If the writer has a 302-page manuscript, about how many pages will the published book have?

    (A) 100 (B) 150 (C) 300 (D) 600 (E) 900

17. If $x - y = 0$, then xy must equal which of the following?

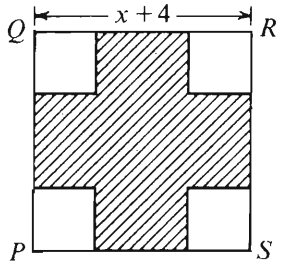
    (A) 0 (B) 1 (C) x (D) x^2 (E) x^2y

18. If $\frac{13}{4} - \frac{7}{7} = n$, then n is

    (A) greater than 3
    (B) between 2 and 3
    (C) between 1 and 2
    (D) between 0 and 1
    (E) less than 0

19. In the repeating decimal $0.0157901579\cdots$, the 29th digit to the right of the decimal point is

    (A) 0 (B) 1 (C) 5 (D) 7 (E) 9



20. In the figure above, square $PQRS$ has side of length $x + 4$ and each of the four smaller squares has side of length 2. If the area of the shaded region is 48, what is the value of x?

    (A) 1 (B) 4 (C) $4\sqrt{2}$ (D) 8 (E) 12

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following table.

UNITED STATES POPULATION

(official census 1890-1980)

Year	Population (in millions)	10-year Increase (in millions)	Year	Population (in millions)	10-year Increase (in millions)
1890	62.9		1940	131.7	8.9
1900	76.0	13.1	1950	150.7	19.0
1910	92.0	16.0	1960	179.3	28.6
1920	105.7	13.7	1970	203.2	23.9
1930	122.8	17.1	1980	223.9	20.7

21. By how many million did the United States population increase from 1920 to 1950 ?

(A) 5.3 (B) 19.0 (C) 45.0
(D) 74.7 (E) 87.8

22. During which of the following 10-year intervals was the United States population increase the least in actual number?

(A) 1890-1900
(B) 1900-1910
(C) 1920-1930
(D) 1930-1940
(E) 1940-1950

23. By approximately what percent did the population of the United States increase from 1900 to 1980 ?

(A) 1.6%
(B) 2.56%
(C) 17%
(D) 116%
(E) 195%

24. In which of the following years will the United States population first reach 260 million?

(A) 1990 (B) 1995 (C) 2000 (D) 2005
(E) It cannot be determined from the information given.

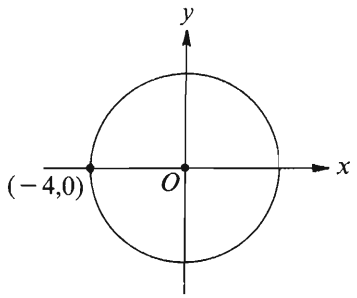
25. If the percent increase in population from 1910 to 1920 had been approximately the same as the percent increase from 1900 to 1910, the 10-year increase, in millions, from 1910 to 1920, would have been approximately

(A) 3
(B) 6
(C) 16
(D) 19
(E) 29

GO ON TO THE NEXT PAGE.

26. The Acme Rent-a-Car agency charges \$10.00 per day and \$0.10 per mile to rent a car. The Super Rent-a-Car agency charges \$20.00 per day and \$0.05 per mile to rent a car. If a car is rented for 1 day, at how many miles would the rental charges of the two agencies be equal?

(A) 50
(B) 100
(C) 150
(D) 175
(E) 200



27. If O is the center of the circle above, what is the circumference of the circle?

(A) 4π (B) 8π (C) 16π (D) 32π (E) 64π

28. If $r = \frac{1}{3}(r + R)$, then what is r in terms of R?

(A) $\frac{1}{3}R$

(B) $\frac{1}{2}R$

(C) $R + 2$

(D) $2R$

(E) $3R$

29. If the average (arithmetic mean) of 5, 9, k, and m is 12, what is the average of $k + 7$ and $m - 3$?

(A) 14
(B) 17
(C) 19
(D) 21
(E) 38

30. The length of rectangular field X is 2 kilometers greater than the side of square field Y, and the width of field X is 2 kilometers less than the side of field Y. If y^2 is the area of field Y in square kilometers, which of the following gives the area, in square kilometers, of field X?

(A) $y^2 - 4$
(B) $y^2 - 2$
(C) y^2
(D) $y^2 + 2$
(E) $y^2 + 4$

SECTION 6

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Though it would be ------- to expect Barnard to have worked out all of the limitations of his experiment, he must be ------- for his neglect of quantitative analysis.

   (A) unjust. . pardoned
   (B) impudent. . dismissed
   (C) unrealistic. . criticized
   (D) pointless. . examined
   (E) inexcusable. . recognized

2. The hierarchy of medical occupations is in many ways a ------- system; its strata remain ------- and the practitioners in them have very little vertical mobility.

   (A) health. . skilled
   (B) delivery. . basic
   (C) regimental. . flexible
   (D) training. . inferior
   (E) caste. . intact

*3. Noting the murder victim's flaccid musculature and pearlike figure, she deduced that the unfortunate fellow had earned his living in some ------- occupation.

   (A) treacherous
   (B) prestigious
   (C) ill-paying
   (D) illegitimate
   (E) sedentary

4. In Germany her startling powers as a novelist are widely -------, but she is almost unknown in the English-speaking world because of the difficulties of ------- her eccentric prose.

   (A) ignored. . editing
   (B) admired. . translating
   (C) espoused. . revealing
   (D) obscured. . comprehending
   (E) dispersed. . transcribing

5. Liberty is not easy, but far better to be an ------- fox, hungry and threatened on its hill, than a ------- canary, safe and secure in its cage.

   (A) unfriendly. . fragile
   (B) aging. . young
   (C) angry. . content
   (D) imperious. . lethargic
   (E) unfettered. . well-fed

6. Remelting old metal cans rather than making primary aluminum from bauxite ore shipped from overseas saves producers millions of dollars in ------- and production costs.

   (A) distribution
   (B) salvage
   (C) storage
   (D) procurement
   (E) research

7. Johnson never ------- to ignore the standards of decent conduct mandated by company policy if ------- compliance with instructions from his superiors enabled him to do so, whatever the effects on his subordinates.

   (A) deigned. . tacit
   (B) attempted. . halfhearted
   (C) intended. . direct
   (D) scrupled. . literal
   (E) wished. . feigned

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. SHOULDER : ROADWAY ::
(A) margin : page (B) cord : weaving
(C) socket : bulb (D) curtain : scenery
(E) handle : pitcher

9. TADPOLE : FROG :: (A) worm : beetle
(B) caterpillar : butterfly (C) carrion : vulture
(D) calf : horse (E) drone : honeybee

10. CIRCUMFERENCE : CIRCLE ::
(A) degree : angle
(B) area : cube
(C) perimeter : rectangle
(D) height : cylinder
(E) arc : ellipse

11. HEDONIST : PLEASURE ::
(A) humanist : pride
(B) ascetic : tolerance
(C) stoic : sacrifice
(D) recluse : privacy
(E) idealist : compromise

12. NONCONFORMIST : NORM ::
(A) pessimist : rule (B) extremist : conviction
(C) criminal : motive (D) deviant : dogma
(E) heretic : orthodoxy

13. INVEST : CAPITAL :: (A) gamble : stake
(B) tax : income (C) play : sport
(D) race : record (E) create : product

14. PREEN : SELF-SATISFACTION ::
(A) fume : anger
(B) inhibit : spontaneity
(C) regret : guilt
(D) resent : cooperation
(E) brood : resolution

15. DIGRESSIVE : STATEMENT ::
(A) connotative : definition
(B) slanderous : slur
(C) tangential : presupposition
(D) biased : opinion
(E) circuitous : route

16. CHICANERY : CLEVER ::
(A) expertise : knowledgeable
(B) certainty : doubtful
(C) gullibility : skeptical
(D) machination : heedless
(E) tactlessness : truthful

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

The social sciences are less likely than other intellectual enterprises to get credit for their accomplishments. Arguably, this is so because the theories and conceptual constructs of the social sciences are especially accessible: human intelligence apprehends truths about human affairs with particular facility. And the discoveries of the social sciences, once isolated and labeled, are quickly absorbed into conventional wisdom, whereupon they lose their distinctiveness as scientific advances.

This underappreciation of the social sciences contrasts oddly with what many see as their overutilization. Game theory is pressed into service in studies of shifting international alliances. Evaluation research is called upon to demonstrate successes or failures of social programs. Models from economics and demography become the definitive tools for examining the financial base of social security. Yet this rush into practical applications is itself quite understandable: public policy must continually be made, and policymakers rightly feel that even tentative findings and untested theories are better guides to decision-making than no findings and no theories at all.

17. The author is primarily concerned with
    (A) advocating a more modest view, and less widespread utilization, of the social sciences
    (B) analyzing the mechanisms for translating discoveries into applications in the social sciences
    (C) dissolving the air of paradox inherent in human beings studying themselves
    (D) explaining a peculiar dilemma that the social sciences are in
    (E) maintaining a strict separation between pure and applied social science

18. Which of the following is a social science discipline that the author mentions as being possibly overutilized?
    (A) Conventional theories of social change
    (B) Game theory
    (C) Decision-making theory
    (D) Economic theories of international alliances
    (E) Systems analysis

19. It can be inferred from the passage that, when speaking of the "overutilization" (line 11) of the social sciences, the author is referring to the
    (A) premature practical application of social science advances
    (B) habitual reliance on the social sciences even where common sense would serve equally well
    (C) practice of bringing a greater variety of social science disciplines to bear on a problem than the nature of the problem warrants
    (D) use of social science constructs by people who do not fully understand them
    (E) tendency on the part of social scientists to recast everyday truths in social science jargon

20. The author confronts the claim that the social sciences are being overutilized with
    (A) proof that overextensions of social science results are self-correcting
    (B) evidence that some public policy is made without any recourse to social science findings or theories
    (C) a long list of social science applications that are perfectly appropriate and extremely fruitful
    (D) the argument that overutilization is by and large the exception rather than the rule
    (E) the observation that this practice represents the lesser of two evils under existing circumstances

GO ON TO THE NEXT PAGE.

The term "Ice Age" may give a wrong impression. The epoch that geologists know as the Pleistocene and that spanned the 1.5 to 2.0 million years prior to the current geologic epoch was not one long continuous glaciation, but a period of oscillating climate with ice advances punctuated by times of interglacial climate not very different from the climate experienced now. Ice sheets that derived from an ice cap centered on northern Scandinavia reached southward to Central Europe. And beyond the margins of the ice sheets, climatic oscillations affected most of the rest of the world; for example, in the deserts, periods of wetter conditions (pluvials) contrasted with drier, interpluvial periods. Although the time involved is so short, about 0.04 percent of the total age of the Earth, the amount of attention devoted to the Pleistocene has been incredibly large, probably because of its immediacy, and because the epoch largely coincides with the appearance on Earth of humans and their immediate ancestors.

There is no reliable way of dating much of the Ice Age. Geological dates are usually obtained by using the rates of decay of various radioactive elements found in minerals. Some of these rates are suitable for very old rocks but involve increasing errors when used for young rocks; others are suitable for very young rocks and errors increase rapidly in older rocks. Most of the Ice Age spans a period of time for which no element has an appropriate decay rate.

Nevertheless, researchers of the Pleistocene epoch have developed all sorts of more or less fanciful model schemes of how they would have arranged the Ice Age had they been in charge of events. For example, an early classification of Alpine glaciation suggested the existence there of four glaciations, named the Günz, Mindel, Riss, and Würm. This succession was based primarily on a series of deposits and events not directly related to glacial and interglacial periods, rather than on the more usual modern method of studying biological remains found in interglacial beds themselves interstratified within glacial deposits. Yet this succession was forced willy-nilly onto the glaciated parts of Northern Europe, where there are partial successions of true glacial ground moraines and interglacial deposits, with hopes of ultimately piecing them together to provide a complete Pleistocene succession. Eradication of the Alpine nomenclature is still proving a Herculean task.

There is no conclusive evidence about the relative length, complexity, and temperatures of the various glacial and interglacial periods. We do not know whether we live in a postglacial period or an interglacial period. The chill truth seems to be that we are already past the optimum climate of postglacial time. Studies of certain fossil distributions and of the pollen of certain temperate plants suggest decreases of a degree or two in both summer and winter temperatures and, therefore, that we may be in the declining climatic phase leading to glaciation and extinction.

21. In the passage, the author is primarily concerned with

(A) searching for an accurate method of dating the Pleistocene epoch
(B) discussing problems involved in providing an accurate picture of the Pleistocene epoch
(C) declaring opposition to the use of the term "Ice Age" for the Pleistocene epoch
(D) criticizing fanciful schemes about what happened in the Pleistocene epoch
(E) refuting the idea that there is no way to tell if we are now living in an Ice Age

22. The "wrong impression" (line 1) to which the author refers is the idea that the

(A) climate of the Pleistocene epoch was not very different from the climate we are now experiencing
(B) climate of the Pleistocene epoch was composed of periods of violent storms
(C) Pleistocene epoch consisted of very wet, cold periods mixed with very dry, hot periods
(D) Pleistocene epoch comprised one period of continuous glaciation during which Northern Europe was covered with ice sheets
(E) Pleistocene epoch had no long periods during which much of the Earth was covered by ice

GO ON TO THE NEXT PAGE.

23. According to the passage, one of the reasons for the deficiencies of the "early classification of Alpine glaciation" (lines 32-33) is that it was

(A) derived from evidence that was only tangentially related to times of actual glaciation
(B) based primarily on fossil remains rather than on actual living organisms
(C) an abstract, imaginative scheme of how the period might have been structured
(D) based on unmethodical examinations of randomly chosen glacial biological remains
(E) derived from evidence that had been haphazardly gathered from glacial deposits and inaccurately evaluated

24. Which of the following does the passage imply about the "early classification of Alpine glaciation" (lines 32-33)?

(A) It should not have been applied as widely as it was.
(B) It represents the best possible scientific practice, given the tools available at the time.
(C) It was a valuable tool, in its time, for measuring the length of the four periods of glaciation.
(D) It could be useful, but only as a general guide to the events of the Pleistocene epoch.
(E) It does not shed any light on the methods used at the time for investigating periods of glaciation.

25. It can be inferred from the passage that an important result of producing an accurate chronology of events of the Pleistocene epoch would be a

(A) clearer idea of the origin of the Earth
(B) clearer picture of the Earth during the time that humans developed
(C) clearer understanding of the reasons for the existence of deserts
(D) more detailed understanding of how radioactive dating of minerals works
(E) firmer understanding of how the northern polar ice cap developed

26. The author refers to deserts primarily in order to

(A) illustrate the idea that an interglacial climate is marked by oscillations of wet and dry periods
(B) illustrate the idea that what happened in the deserts during the Ice Age had far-reaching effects even on the ice sheets of Central and Northern Europe
(C) illustrate the idea that the effects of the Ice Age's climatic variations extended beyond the areas of ice
(D) support the view that during the Ice Age sheets of ice covered some of the deserts of the world
(E) support the view that we are probably living in a postglacial period

27. The author would regard the idea that we are living in an interglacial period as

(A) unimportant
(B) unscientific
(C) self-evident
(D) plausible
(E) absurd

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. INSTINCT: (A) hallucination (B) reservation (C) irrational fear (D) learned response (E) unobtainable desire

29. SENSATION:
(A) sketchy account
(B) recurring phenomenon
(C) unfinished story
(D) unnoticed event
(E) well-received effort

30. TRANQUILLITY: (A) leniency (B) virtue (C) pandemonium (D) morbidity (E) eclecticism

31. PLASTICITY: (A) purity (B) solidity (C) rigidity (D) sternness (E) massiveness

32. RIFT: (A) bondage (B) capitulation (C) fidelity (D) consistency (E) reconciliation

33. DESICCATE: (A) lactate (B) hydrate (C) make appetizing (D) allow to putrify (E) start to accelerate

34. ERUDITION: (A) boorishness (B) prescience (C) ignorance (D) wealth (E) simplicity

35. AFFABLE: (A) sentimental (B) disobedient (C) irascible (D) equivocal (E) underhanded

36. APOCRYPHAL: (A) authenticated (B) annotated (C) famous (D) restored (E) sophisticated

37. RECALCITRANT: (A) trustworthy (B) expectant (C) extravagant (D) capable (E) amenable

38. HALCYON: (A) future (B) healthy (C) inane (D) extraordinary (E) miserable

FOR GENERAL TEST 14 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 1			Section 6		
Number	Answer	P+	Number	Answer	P+
1	A	97	1	C	88
2	C	83	2	E	84
3	A	74	3	E	76
4	E	51	4	B	95
5	A	43	5	E	58
6	B	41	6	D	67
7	D	26	7	D	9
8	E	92	8	A	92
9	C	80	9	B	89
10	D	50	10	C	83
11	D	56	11	D	62
12	A	33	12	E	55
13	C	43	13	A	48
14	A	41	14	A	43
15	D	28	15	E	34
16	E	20	16	E	21
17	C	83	17	D	68
18	D	65	18	B	77
19	B	81	19	A	39
20	C	64	20	E	53
21	B	76	21	B	67
22	A	56	22	D	31
23	D	68	23	A	37
24	D	39	24	A	44
25	B	66	25	B	59
26	E	74	26	C	44
27	A	60	27	D	70
28	A	88	28	D	86
29	B	84	29	D	80
30	B	72	30	C	85
31	D	57	31	C	66
32	D	50	32	E	49
33	A	42	33	B	54
34	B	34	34	C	42
35	A	39	35	C	46
36	B	32	36	A	39
37	B	37	37	E	37
38	D	28	38	E	26

QUANTITATIVE ABILITY					
Section 2			Section 5		
Number	Answer	P+	Number	Answer	P+
1	A	90	1	B	86
2	B	91	2	B	83
3	A	79	3	A	87
4	C	85	4	A	80
5	D	74	5	B	82
6	C	83	6	B	63
7	A	80	7	A	81
8	B	65	8	A	67
9	B	79	9	C	66
10	A	69	10	D	70
11	A	57	11	C	49
12	D	59	12	C	35
13	B	54	13	B	49
14	D	25	14	D	41
15	C	16	15	C	26
16	D	79	16	A	95
17	D	79	17	D	69
18	B	74	18	B	80
19	A	84	19	D	87
20	E	72	20	B	60
21	B	91	21	C	91
22	D	65	22	D	74
23	C	71	23	E	62
24	E	61	24	E	71
25	A	44	25	D	33
26	C	53	26	E	60
27	A	56	27	B	60
28	A	52	28	B	52
29	D	52	29	C	48
30	B	49	30	A	45

ANALYTICAL ABILITY					
Section 3			Section 4		
Number	Answer	P+	Number	Answer	P+
1	B	87	1	E	88
2	E	89	2	E	83
3	C	81	3	D	51
4	E	60	4	B	77
5	C	74	5	C	80
6	E	29	6	C	82
7	D	87	7	E	92
8	B	75	8	C	90
9	B	56	9	B	74
10	A	92	10	A	57
11	D	80	11	B	54
12	B	81	12	E	61
13	A	69	13	A	92
14	C	65	14	A	33
15	E	75	15	D	15
16	A	58	16	D	55
17	E	34	17	C	76
18	C	61	18	A	67
19	C	41	19	C	62
20	D	33	20	A	41
21	E	31	21	E	45
22	E	28	22	E	34
23	A	65	23	B	62
24	C	53	24	D	45
25	C	38	25	D	45

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 14 ONLY AND THE PERCENTS BELOW*

Raw Score	Scaled Scores and Percents Below						Raw Score	Scaled Scores and Percents Below					
	Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below		Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below
73-76	800	99					39	440	38	550	48	640	79
72	790	99					38	430	36	540	45	630	76
71	770	99					37	420	33	530	42	610	72
70	760	99					36	410	30	520	40	600	69
69	750	98					35	400	26	510	37	590	67
68	730	97					34	390	24	500	35	570	61
67	720	96					33	390	24	490	32	560	58
66	710	95					32	380	22	470	28	540	52
65	700	95					31	370	20	460	26	530	49
64	680	93					30	360	16	450	24	510	43
63	670	92					29	350	14	440	22	500	40
62	660	90					28	350	14	430	20	480	35
61	650	89					27	340	12	420	18	470	32
60	640	87	800	97			26	330	10	410	16	450	27
59	630	85	800	97			25	320	9	400	14	440	24
58	620	84	800	97			24	310	7	380	12	420	20
57	600	80	780	94			23	310	7	370	10	410	18
56	590	78	760	92			22	300	6	360	9	390	15
55	580	76	750	89			21	290	5	350	7	380	13
54	570	74	730	86			20	280	4	340	6	360	10
53	560	72	720	84			19	270	3	320	5	350	9
52	550	69	700	80			18	260	2	310	4	340	7
51	540	67	690	78			17	250	1	300	3	320	6
50	530	64	670	74	800	99	16	240	1	290	2	310	4
49	530	64	660	72	800	99	15	230	1	270	2	300	4
48	520	61	650	70	800	99	14	220	0	260	1	290	3
47	510	59	640	68	770	97	13	210	0	240	1	280	2
46	500	56	620	63	750	96	12	200	0	230	0	270	2
45	490	54	610	61	730	94	11	200	0	210	0	250	1
44	480	51	600	59	720	92	10	200	0	200	0	240	1
43	470	48	590	57	700	90	9	200	0	200	0	230	1
42	460	44	580	54	690	88	8	200	0	200	0	220	0
41	450	41	570	51	670	85	7	200	0	200	0	210	0
40	440	38	560	49	660	83	0-6	200	0	200	0	200	0

*Percent scoring below the scaled score is based on the performance of 923,359 examinees who took the General Test between October 1, 1986, and September 30, 1989.

TEST 15

SECTION 1

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-5

Six arms negotiators—M, O, P, R, S, and T—are to be seated at a round table to discuss disarmament. There are exactly six chairs around the table. Each negotiator sits facing the center of the table and is directly opposite a negotiator across the table. The seating arrangement is subject to the following restrictions:

T cannot sit next to P.
S cannot sit next to M.
R must sit next to M.

1. If R sits next to S on S's right side, who must sit next to R on R's right side?

   (A) M (B) O (C) P (D) S (E) T

2. Which of the following is an acceptable sequence of negotiators around the table?

   (A) M, S, R, T, P, O
   (B) M, S, T, P, R, O
   (C) T, O, P, S, M, R
   (D) T, R, M, P, S, O
   (E) T, S, R, M, O, P

3. If M sits next to P, which of the following is a complete and accurate list of those who can sit next to P on P's other side?

   (A) O
   (B) O, S
   (C) O, S, R
   (D) R, S, T
   (E) O, R, S, T

4. If T sits next to M and S sits next to R, which of the other negotiators must sit next to S?

   (A) M (B) O (C) P (D) R (E) T

5. If T sits directly across the table from O, who must sit on either side of P?

   (A) M and O
   (B) M and S
   (C) O and R
   (D) O and S
   (E) R and T

GO ON TO THE NEXT PAGE.

6. Contrary to the assumption that modern technology allows us to improve on nature, it is clear that any major technologically induced changes in a natural system are likely to be detrimental to that system. If you were to open the back of your watch, close your eyes, and poke a pencil into the exposed works, the almost certain result would be damage to the watch. Living organisms too, when subjected to technological alteration, will almost certainly be damaged rather than improved.

   The argument above is developed by

   (A) citing a consensus of opinion about technology among informed observers
   (B) projecting the effects of change in a natural system from observation of a representative case
   (C) drawing an analogy between a natural system and a mechanical device
   (D) analyzing a natural system in terms of its constituent parts
   (E) examining the results of technological innovations of the past

7. The plant called the scarlet gilia can have either red or white flowers. It had long been thought that hummingbirds, which forage by day, pollinate its red flowers and that hawkmoths, which forage at night, pollinate its white flowers. To try to show that this pattern of pollination by colors exists, scientists recently covered some scarlet gilia flowers only at night and others only by day: plants with red flowers covered at night became pollinated; plants with white flowers covered by day became pollinated.

   Which of the following, if true, would be additional evidence to suggest that hummingbirds are attracted to the red flowers and hawkmoths to the white flowers of the scarlet gilia?

   (A) Uncovered scarlet gilia flowers, whether red or white, became pollinated at approximately equal rates.
   (B) Some red flowers of the scarlet gilia that remained uncovered at all times never became pollinated.
   (C) White flowers of the scarlet gilia that were covered at night became pollinated with greater frequency than white flowers of the scarlet gilia that were left uncovered.
   (D) Scarlet gilia plants with red flowers covered by day and scarlet gilia plants with white flowers covered at night remained unpollinated.
   (E) In late August, when most of the hummingbirds had migrated but hawkmoths were still plentiful, red scarlet gilia plants produced fruit more frequently than they had earlier in the season.

8. The chief executive officer of one of the country's most successful steel manufacturing firms is amused at the publicity her management practices have attracted. She thinks managers get too much of the credit for upswings in their businesses. "A fickle public assumes too easily that managers are brilliant when demand is strong and idiotic when it is weak," she asserts.

   It can be inferred from the statement made by the chief executive officer that she believes which of the following?

   (A) A successful manager should attempt to control public opinion.
   (B) There are no managers who can justifiably be said to be brilliant.
   (C) Her own management practices are likely to be of little value to other businesses.
   (D) The role of managers becomes less important during economic downturns than it is in relatively prosperous times.
   (E) The level of demand for the products of manufacturing firms cannot be completely controlled by the managers of the firms.

GO ON TO THE NEXT PAGE.

Questions 9-13

Exactly six detectives—S, T, U, X, Y, and Z—take turns watching a suspect. To minimize the chance that the suspect will observe them or will escape their surveillance, the detectives will operate according to the following conditions:

There must be exactly two detectives watching the suspect at all times.
Whenever the suspect travels by car, either U or X must be one of the two detectives watching, but U and X cannot take a turn together.
Whenever the suspect travels by train, either T or Z must be one of the two detectives watching, but T and Z cannot take a turn together.
If Z is one of the detectives watching the suspect, S must be the other detective watching the suspect.
S and X cannot take a turn together watching the suspect.

9. If the suspect is traveling by car, which of the following is a pair of detectives who could be watching?

(A) S and T
(B) S and X
(C) T and Y
(D) U and X
(E) U and Y

10. If the suspect travels by train and T is not one of the detectives watching, the pair watching must be

(A) S and Y
(B) S and Z
(C) U and Z
(D) X and Y
(E) X and Z

11. If Y is one of the detectives watching the suspect, which of the following CANNOT be the other detective watching the suspect?

(A) S (B) T (C) U (D) X (E) Z

12. If the suspect travels by car and S is one of the detectives watching, the other detective watching the suspect must be

(A) T (B) U (C) X (D) Y (E) Z

13. If a pair of detectives was watching while the suspect traveled by car, and the same pair of detectives continued watching after the suspect began to travel by train, one member of that pair of detectives must have been

(A) T (B) U (C) X (D) Y (E) Z

Questions 14-16

A hospital administrator is assigning five patients—N, P, T, V, and X—to three rooms. Each room has two single beds for patients. The assignment is subject to the following restrictions:

Patients sharing a room must be of the same sex.
A patient with disease G cannot share a room with a patient who has an infection.
Patients V and X have disease G and no infection.
Patient N has an infection.
Patients P and T each have a broken leg and no other illness or disability.
Patients N, T, and X are male, and patients P and V are female.

14. If N shares a room with T, which of the following is true?

(A) None of the patients shares a room with any patient with disease G.
(B) None of the patients shares a room with X.
(C) None of the patients shares a room with any patient with a broken leg.
(D) A patient with a broken leg shares a room with X.
(E) A patient with disease G shares a room with X.

15. If a sixth patient is assigned to the remaining bed, it must be true that the sixth patient

(A) is male
(B) is female or, if male, does not have an infection
(C) has a broken leg
(D) does not have an infection
(E) has disease G

16. If Z, a male patient with disease G and no infection, is a newly admitted sixth patient who is also to be assigned to one of the three rooms, Z must share a room with

(A) N (B) P (C) T (D) V (E) X

GO ON TO THE NEXT PAGE.

Questions 17-22

During its manufacture any widget enters an assembly line having exactly seven consecutively numbered work stations (1 through 7). Each station is operated by either one human worker or by one robot. Exactly three of the operators—K, L, and M—are human workers. Exactly two of the operators—R-1 and R-2—are robots, and each of the robots operates exactly two consecutively numbered stations.

An entering widget arrives first at station 1 and is subsequently moved through stations 2, 3, 4, 5, 6, and 7, in that order. However, if at any station a flaw is detected in a widget, that widget is removed from the assembly line at the station where the flaw is detected. A flaw in a widget can occur anywhere on the assembly line, and a flaw can be detected at any station operated by a human worker, with the exception that flaws in widgets cannot be detected at station 1. A widget enters an assembly line on one occasion only.

Although only human operators can detect flaws in widgets, they do not necessarily detect every flaw.

17. Which of the following is a possible set of assignments of operators to stations?

	Station Number						
	1	2	3	4	5	6	7
(A)	R-2	R-2	L	K	M	R-1	R-1
(B)	R-1	R-2	M	R-1	R-2	K	L
(C)	M	R-1	R-1	K	R-2	L	R-2
(D)	L	M	R-2	R-1	R-2	R-1	K
(E)	K	L	R-1	R-1	R-2	M	L

18. If K is assigned to station 7 and L is assigned to station 4, which of the following must be true?

(A) K but not L could detect a flaw in a widget on the assembly line.
(B) M is assigned to either station 1 or 3.
(C) R-1 is assigned to either station 3 or 5.
(D) R-2 is assigned to stations 5 and 6.
(E) A flaw in a widget that is created at station 3 could be detected at station 6.

19. If R-2 causes a flaw in a widget at station 4, and the flaw is detected and the flawed widget is removed from the assembly line at station 6, L could operate any one of the following stations EXCEPT

(A) 1 (B) 2 (C) 3 (D) 5 (E) 7

20. If M operates station 6, which of the following must be true?

(A) K operates either station 1 or 7.
(B) L operates either station 3 or 5.
(C) Either K or L operates an even-numbered station.
(D) K and L operate stations that are immediately adjacent to each other.
(E) L operates an odd-numbered station.

21. If R-1 operates station 3 and K is the only operator on the assembly line who is in a position to detect flaws in widgets that are created by R-1, which of the following must be true?

(A) K operates station 4.
(B) K operates station 5.
(C) L operates station 1.
(D) R-1 operates station 4.
(E) R-2 operates station 5.

22. Under an additional rule stipulating that R-1 must operate station 3 or 4 but cannot operate both, and that R-2 must operate station 5 or 6 but cannot operate both, any of the following would be possible robot assignments EXCEPT:

(A) R-1 is assigned to station 2, and R-2 is assigned to station 4.
(B) R-1 is assigned to station 3, and R-2 is assigned to station 5.
(C) R-1 is assigned to station 3, and R-2 is assigned to station 6.
(D) R-1 is assigned to station 4, and R-2 is assigned to station 5.
(E) R-1 is assigned to station 5, and R-2 is assigned to station 6.

GO ON TO THE NEXT PAGE.

23. To many environmentalists, the extinction of plants—accompanied by the increasing genetic uniformity of species of food crops—is the single most serious environmental problem. Something must be done to prevent the loss of wild food plants or no-longer-cultivated food plants. Otherwise, the lack of genetic diversity could allow a significant portion of a major crop to be destroyed overnight. In 1970, for example, southern leaf blight destroyed approximately 20 percent of the United States corn crop, leaving very few varieties of corn unaffected in the areas over which the disease had spread.

    Which of the following can be inferred from the passage above?

    (A) Susceptibility to certain plant diseases is genetically determined.
    (B) Eighty percent of the corn grown in the United States is resistant to southern leaf blight.
    (C) The extinction of wild food plants can in almost every case be traced to destructive plant diseases.
    (D) Plant breeders focus on developing plants that are resistant to plant disease.
    (E) Corn is the only food crop threatened by southern leaf blight.

24. Many pregnant women suffer from vitamin deficiency, but this is frequently not due to vitamin deficiency in their diets; most often it is because they have higher requirements for vitamins than do the rest of the population.

    The best criticism of the reasoning in the statement above is that it

    (A) fails to specify the percentage of pregnant women who suffer from vitamin deficiency
    (B) gives insufficient information about why pregnant women have higher vitamin requirements than do other groups
    (C) fails to employ the same reference group for both uses of the term "vitamin deficiency"
    (D) provides insufficient information about the incidence of vitamin deficiency in other groups with high vitamin requirements
    (E) uses "higher requirements" in an ambiguous manner

25. Whenever the sun is shining and the windchill factor is below zero, Susan wears her parka. Whenever it is raining and the windchill factor is above zero, Susan wears her raincoat. Sometimes it rains when the sun is shining.

    If the above statements are true, which of the following must also be true?

    (A) If it is not raining and Susan is wearing her parka, the sun is shining.
    (B) If the windchill factor is below zero and Susan is not wearing her parka, the sun is not shining.
    (C) If the windchill factor is below zero and it is not raining, Susan is wearing her parka.
    (D) If the windchill factor is below zero and it is raining, Susan is wearing her raincoat.
    (E) If it rains while the sun is shining and the windchill factor is zero, Susan wears her parka.

SECTION 2
Time—30 minutes
38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Despite the apparently bewildering complexity of this procedure, the underlying ------- is quite -------.

   (A) simplicity. .calculated
   (B) principle. .elementary
   (C) confusion. .imaginary
   (D) purpose. .effective
   (E) theory. .modern

2. In television programming, a later viewing time often ------- a more ------- audience and, therefore, more challenging subjects and themes.

   (A) requires. .critical (B) evinces. .affluent
   (C) implies. .mature (D) eliminates. .realistic
   (E) invites. .general

3. The cultivation of the emotion of *natsukashii*, interpretable as "pleasant sorrow," brings Japanese to Kyoto in the spring, not to ------- the cherry blossoms in full bloom but to ------- the fading, falling flowers.

   (A) mourn. .exclaim over
   (B) honor. .protect
   (C) describe. .rejoice over
   (D) arrange. .preserve
   (E) savor. .grieve over

4. Adam Smith's *Wealth of Nations* (1776) is still worth reading, more to appreciate the current ------- of Smith's valid contributions to economics than to see those contributions as the ------- of present-day economics.

   (A) disregard. .outgrowths
   (B) reaffirmation. .concerns
   (C) relevance. .precursors
   (D) acceptance. .byproducts
   (E) importance. .vestiges

5. At several points in his discussion, Graves, in effect, ------- evidence when it does not support his argument, tailoring it to his needs.

   (A) addresses (B) creates (C) alters
   (D) suppresses (E) substitutes

6. Regardless of what ------- theories of politics may propound, there is nothing that requires daily politics to be clear, thorough, and consistent—nothing, that is, that requires reality to conform to theory.

   (A) vague (B) assertive (C) casual
   (D) vicious (E) tidy

7. Exposure to sustained noise has been claimed to ------- blood pressure regulation in human beings and, particularly, to increase hypertension, even though some researchers have obtained inconclusive results that ------- the relationship.

   (A) sharpen. .conflate
   (B) increase. .diminish
   (C) aggravate. .buttress
   (D) disrupt. .neutralize
   (E) impair. .obscure

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. SOLDIER : ARMY :: (A) gas : vapor
(B) music : harmony (C) ruler : height
(D) negative : exposure (E) element : compound

9. SLUR : SPEECH :: (A) erase : drawing
(B) smudge : writing (C) confuse : puzzle
(D) crumble : construction (E) decrease : volume

10. LOCOMOTIVE : FLATCAR :: (A) bus : passenger
(B) airplane : cargo (C) bicycle : frame
(D) tugboat : barge (E) automobile : chassis

11. TRICKLE : GUSH :: (A) breathe : exhale
(B) amble : move (C) stain : blotch
(D) warm : sear (E) teach : educate

12. CHARADE : WORD :: (A) symbol : algebra
(B) joke : riddle (C) sign : direction
(D) mime : story (E) lie : truth

13. EPAULET : SHOULDER :: (A) ring : finger
(B) tassel : wrist (C) cravat : waist
(D) sash : neck (E) poncho : arm

14. VERNACULAR : PLACE ::
(A) landmark : tradition (B) code : solution
(C) fingerprint : identity (D) symptom : disease
(E) jargon : profession

15. HEAT : CALORIES ::
(A) liquid : gallons
(B) exercise : energy
(C) steam : pressure
(D) lamp : watts
(E) thermometer : degrees

16. MARTIAL : MILITARY ::
(A) basic : simplistic
(B) classic : musical
(C) cosmic : planetary
(D) runic : mysterious
(E) endemic : patriotic

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Eight percent of the Earth's crust is aluminum, and there are hundreds of aluminum-bearing minerals and vast quantities of the rocks that contain them. The best aluminum ore is bauxite, defined as aggregates of aluminous minerals, more or less impure, in which aluminum is present as hydrated oxides. Bauxite is the richest of all those aluminous rocks that occur in large quantities, and it yields alumina, the intermediate product required for the production of aluminum. Alumina also occurs naturally as the mineral corundum, but corundum is not found in large deposits of high purity, and therefore it is an impractical source for making aluminum. Most of the many abundant nonbauxite aluminous minerals are silicates, and, like all silicate minerals, they are refractory, resistant to analysis, and extremely difficult to process. The aluminum silicates are therefore generally unsuitable alternatives to bauxite because considerably more energy is required to extract alumina from them.

17. The author implies that a mineral must either be or readily supply which of the following in order to be classified as an aluminum ore?

    (A) An aggregate
    (B) Bauxite
    (C) Alumina
    (D) Corundum
    (E) An aluminum silicate

18. The passage supplies information for answering all of the following questions regarding aluminous minerals EXCEPT:

    (A) What percentage of the aluminum in the Earth's crust is in the form of bauxite?
    (B) Are aluminum-bearing nonbauxite minerals plentiful?
    (C) Do the aluminous minerals found in bauxite contain hydrated oxides?
    (D) Are aluminous hydrated oxides found in rocks?
    (E) Do large quantities of bauxite exist?

19. The author implies that corundum would be used to produce aluminum if

    (A) corundum could be found that is not contaminated by silicates
    (B) the production of alumina could be eliminated as an intermediate step in manufacturing aluminum
    (C) many large deposits of very high quality corundum were to be discovered
    (D) new technologies were to make it possible to convert corundum to a silicate
    (E) manufacturers were to realize that the world's supply of bauxite is not unlimited

GO ON TO THE NEXT PAGE.

Traditionally, the study of history has had fixed boundaries and focal points—periods, countries, dramatic events, and great leaders. It also has had clear and firm notions of scholarly procedure: how one inquires into a historical problem, how one presents and documents one's findings, what constitutes admissible and adequate proof.

Anyone who has followed recent historical literature can testify to the revolution that is taking place in historical studies. The currently fashionable subjects come directly from the sociology catalog: childhood, work, leisure. The new subjects are accompanied by new methods. Where history once was primarily narrative, it is now entirely analytic. The old questions "What happened?" and "How did it happen?" have given way to the question "Why did it happen?" Prominent among the methods used to answer the question "Why" is psychoanalysis, and its use has given rise to psychohistory.

Psychohistory does not merely use psychological explanations in historical contexts. Historians have always used such explanations when they were appropriate and when there was sufficient evidence for them. But this pragmatic use of psychology is not what psychohistorians intend. They are committed, not just to psychology in general, but to Freudian psychoanalysis. This commitment precludes a commitment to history as historians have always understood it. Psychohistory derives its "facts" not from history, the detailed records of events and their consequences, but from psychoanalysis of the individuals who made history, and deduces its theories not from this or that instance in their lives, but from a view of human nature that transcends history. It denies the basic criterion of historical evidence: that evidence be publicly accessible to, and therefore assessable by, all historians. And it violates the basic tenet of historical method: that historians be alert to the negative instances that would refute their theses. Psychohistorians, convinced of the absolute rightness of their own theories, are also convinced that theirs is the "deepest" explanation of any event, that other explanations fall short of the truth.

Psychohistory is not content to violate the discipline of history (in the sense of the proper mode of studying and writing about the past); it also violates the past itself. It denies to the past an integrity and will of its own, in which people acted out of a variety of motives and in which events had a multiplicity of causes and effects. It imposes upon the past the same determinism that it imposes upon the present, thus robbing people and events of their individuality and of their complexity. Instead of respecting the particularity of the past, it assimilates all events, past and present, into a single deterministic schema that is presumed to be true at all times and in all circumstances.

20. Which of the following best states the main point of the passage?

(A) The approach of psychohistorians to historical study is currently in vogue even though it lacks the rigor and verifiability of traditional historical method.
(B) Traditional historians can benefit from studying the techniques and findings of psychohistorians.
(C) Areas of sociological study such as childhood and work are of little interest to traditional historians.
(D) The psychological assessment of an individual's behavior and attitudes is more informative than the details of his or her daily life.
(E) History is composed of unique and nonrepeating events that must be individually analyzed on the basis of publicly verifiable evidence.

21. It can be inferred from the passage that one way in which traditional history can be distinguished from psychohistory is that traditional history usually

(A) views past events as complex and having their own individuality
(B) relies on a single interpretation of human behavior to explain historical events
(C) interprets historical events in such a way that their specific nature is transcended
(D) turns to psychological explanations in historical contexts to account for events
(E) relies strictly on data that are concrete and quantifiable

22. It can be inferred from the passage that the methods used by psychohistorians probably prevent them from

(A) presenting their material in chronological order
(B) producing a one-sided picture of an individual's personality and motivations
(C) uncovering alternative explanations that might cause them to question their own conclusions
(D) offering a consistent interpretation of the impact of personality on historical events
(E) recognizing connections between a government's political actions and the aspirations of government leaders

GO ON TO THE NEXT PAGE.

23. The passage supplies information for answering which of the following questions?

(A) What are some specific examples of the use of psychohistory in historical interpretation?
(B) When were the conventions governing the practice of traditional history first established?
(C) When do traditional historians consider psychological explanations of historical developments appropriate?
(D) What sort of historical figure is best suited for psychohistorical analysis?
(E) What is the basic criterion of historical evidence required by traditional historians?

24. The author mentions which of the following as a characteristic of the practice of psychohistorians?

(A) The lives of historical figures are presented in episodic rather than narrative form.
(B) Archives used by psychohistorians to gather material are not accessible to other scholars.
(C) Past and current events are all placed within the same deterministic schema.
(D) Events in the adult life of a historical figure are seen to be more consequential than are those in the childhood of the figure.
(E) Analysis is focused on group behavior rather than on particular events in an individual's life.

25. The author of the passage suggests that psychohistorians view history primarily as

(A) a report of events, causes, and effects that is generally accepted by historians but which is, for the most part, unverifiable
(B) an episodic account that lacks cohesion because records of the role of childhood, work, and leisure in the lives of historical figures are rare
(C) an uncharted sea of seemingly unexplainable events that have meaning only when examined as discrete units
(D) a record of the way in which a closed set of immutable psychological laws seems to have shaped events
(E) a proof of the existence of intricate causal interrelationships between past and present events

26. The author of the passage puts the word "deepest" (line 44) in quotation marks most probably in order to

(A) signal her reservations about the accuracy of psychohistorians' claims for their work
(B) draw attention to a contradiction in the psychohistorians' method
(C) emphasize the major difference between the traditional historians' method and that of psychohistorians
(D) disassociate her opinion of the psychohistorians' claims from her opinion of their method
(E) question the usefulness of psychohistorians' insights into traditional historical scholarship

27. In presenting her analysis, the author does all of the following EXCEPT:

(A) Make general statements without reference to specific examples.
(B) Describe some of the criteria employed by traditional historians.
(C) Question the adequacy of the psychohistorians' interpretation of events.
(D) Point out inconsistencies in the psychohistorians' application of their methods.
(E) Contrast the underlying assumptions of psychohistorians with those of traditional historians.

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. GROUP: (A) restrain (B) isolate (C) confound (D) abandon (E) reveal

29. IMMEDIATE: (A) complex (B) limited (C) future (D) multiple (E) tiring

30. PERSEVERANCE:
(A) obvious suffering
(B) abnormal tranquillity
(C) lack of promptness
(D) cessation of effort
(E) frequency of occurrence

31. OFF-KEY:
(A) with sensitive phrasing
(B) with a suitable instrument
(C) at the right volume
(D) at a regular beat
(E) at the proper pitch

32. BOLSTER: (A) cancel (B) disconnect (C) delete (D) decrease support of (E) lose faith in

33. DEBACLE:
(A) definite agreement
(B) complete success
(C) ungrudging acceptance
(D) unquestionable assumption
(E) frank response

34. ALLEVIATE: (A) transpose (B) exacerbate (C) fortify (D) rectify (E) proliferate

35. ARTLESSNESS: (A) originality (B) objectivity (C) cunning (D) foresight (E) resentment

36. LABILE: (A) intrinsic (B) differential (C) colorable (D) restored (E) stable

37. NUGATORY: (A) tasteful (B) unlimited (C) innovative (D) fashionable (E) consequential

38. BENT: (A) symmetry (B) rigidity (C) ineptitude (D) nonchalance (E) trustworthiness

SECTION 3

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

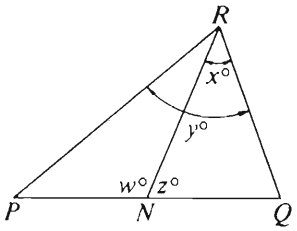
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

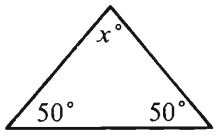
Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
		
1.	x	100
2.	2^5	5^2
	$x = 3$	
3.	$4x^2$	144
	$r + 5 = 7$ $s - 5 = 8$	
4.	$r + s$	15
5.	The average (arithmetic mean) of 67, 78, and 89	The average (arithmetic mean) of 66, 78, and 89

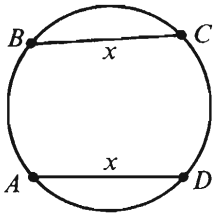
When Fred drives from his home to the nearest mountain resort, it takes 4 hours at an average speed of 50 miles per hour. When Fred drives from his home to his beach house, it takes 3.5 hours at an average speed of 55 miles per hour.

6.	Fred's driving distance from his home to the nearest mountain resort	Fred's driving distance from his home to his beach house

	Column A	Column B
7.	$\frac{4}{\sqrt{2}}$	$\sqrt{2}$
	$x(x + 1) + 1 = x + 1$	
8.	x	0

When Carl and Linda started to diet, Carl's starting weight was 8 pounds more than Linda's starting weight. At the end of the diet, each had lost 15 pounds.

9.	Percent of Carl's starting weight lost on the diet	Percent of Linda's starting weight lost on the diet
10.	The area of a circular region that has radius 5 centimeters	Six times the area of a circular region that has radius 2 centimeters

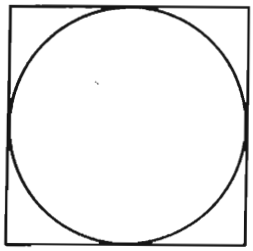


11.	The length of arc ABC	The length of arc ADC

GO ON TO THE NEXT PAGE.

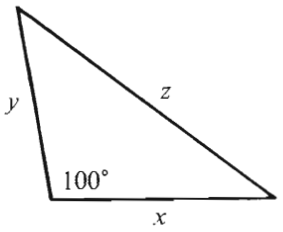
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	$n \neq 0$	
12.	$\frac{n}{12}$	$\frac{n \div 4}{3}$
	$x = 1 - y$	
13.	x	y



A circular tabletop is to be cut from a square piece of wood as shown above.

14.	Percent of the wood surface shown above that is not to be used for the tabletop	25%

	Column A	Column B
15.		
	$x^2 + y^2$	z^2

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. If $y = 2$, then $y + (y^2)^3 =$

(A) 32 (B) 34 (C) 64 (D) 66 (E) 128

17. If $6 + 5x = 30 - x$, then $x =$

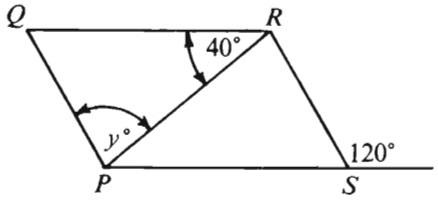
(A) 4 (B) 5 (C) 6 (D) 7 (E) 8

18. Which of the following is equal to $456(72) + 28(456)$?

(A) $(72)(456 + 28)$
(B) $(456)(72 + 28)$
(C) $(456 + 28)(72 + 456)$
(D) $(456 + 72)(28 + 456)$
(E) $(456 + 456)(72 + 28)$

19. Which of the following equals the ratio of $2\frac{1}{2}$ to $3\frac{1}{2}$?

(A) 2 to 3
(B) 5 to 7
(C) 3 to 2
(D) 7 to 5
(E) 35 to 4



20. In the figure above, if $PQRS$ is a parallelogram, then $y =$

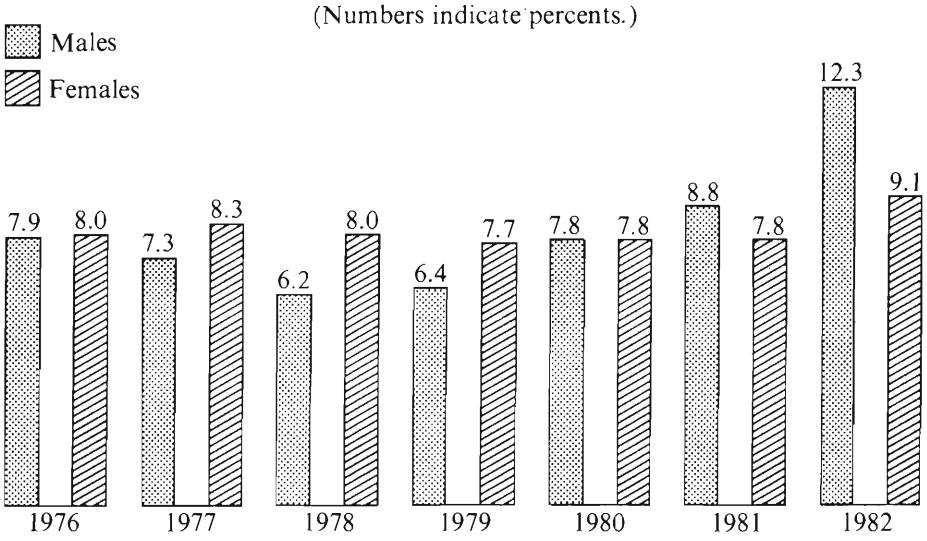
(A) 20 (B) 40 (C) 60 (D) 80 (E) 100

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graph.

STATE Z UNEMPLOYMENT RATES*

(Numbers indicate percents.)



*Rates are based on male and female labor forces, respectively.

21. For how many of the years shown was the unemployment rate for females less than the unemployment rate for males?

(A) One (B) Two (C) Three
(D) Four (E) Five

22. For how many of the years from 1977 through 1982, inclusive, did the unemployment rate for males increase over the rate for males the previous year?

(A) One (B) Two (C) Three
(D) Four (E) Five

23. In State Z in 1982, the total labor force was 1 million, of which 55 percent were males. If the unemployment rate for males is defined as the ratio of the number of unemployed males to the number of males in the labor force, what was the approximate number of unemployed males in State Z in 1982?

(A) 70,000
(B) 55,000
(C) 50,000
(D) 40,000
(E) 15,000

24. What was the unemployment rate (including both males and females) in State Z during 1977?

(A) 7.8%
(B) 8.3%
(C) 15.6%
(D) 16.6%
(E) It cannot be determined from the information given.

25. Which of the following statements about unemployment in State Z can be inferred from the graph?

I. The same number of females were unemployed in 1981 as in 1980.
II. The unemployment rate for males in 1982 was more than $1\frac{1}{2}$ times the rate for males in 1976.
III. From 1978 to 1979, the number of unemployed males increased.

(A) None (B) I only (C) II only
(D) III only (E) I, II, and III

GO ON TO THE NEXT PAGE.

26. In a class of 120 students, 60 percent can speak French and the rest can speak only English. If 25 percent of those in the class who can speak French can also speak English, how many of the students in the class can speak English?

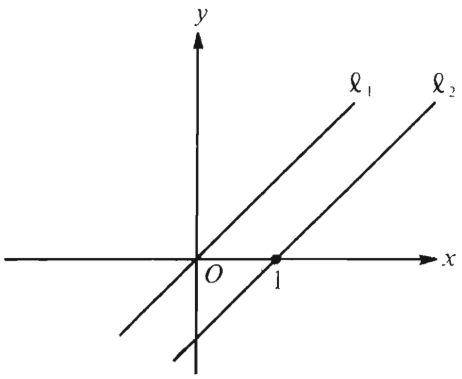
(A) 54
(B) 60
(C) 66
(D) 84
(E) 90

27. If $k = \frac{6x}{7}$ and $k \neq 0$, then $\frac{2x}{7k} =$

(A) $\frac{1}{6}$ (B) $\frac{12}{49}$ (C) $\frac{2}{7}$ (D) $\frac{1}{3}$ (E) $\frac{6}{7}$

28. The dimensions, in centimeters, of rectangular box R are 6 by 8 by 10. Which of the following CANNOT be the total surface area, in square centimeters, of two faces of R ?

(A) 96 (B) 120 (C) 128
(D) 160 (E) 180



29. In the rectangular coordinate system above, if the equation of ℓ_1 is $y = x$ and $\ell_1 \parallel \ell_2$, what is the shortest distance between ℓ_1 and ℓ_2?

(A) $\sqrt{2}$ (B) 1 (C) $\frac{\sqrt{2}}{2}$ (D) $\frac{1}{2}$ (E) $\frac{1}{4}$

30. The positive quantities x, y, and z vary over time, and $\frac{2x}{3}$ always equals $16yz$. If y is tripled and z is halved, then x is

(A) decreased by 50%
(B) decreased by $33\frac{1}{3}\%$
(C) unchanged
(D) increased by $33\frac{1}{3}\%$
(E) increased by 50%

SECTION 4

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. After a slow sales start early in the year, mobile homes have been gaining favor as ------- to increasingly expensive conventional housing.

   (A) a reaction (B) an addition
   (C) an introduction (D) an alternative
   (E) a challenge

2. Just as such apparently basic things as rocks, clouds, and clams are, in fact, intricately structured entities, so the self, too, is not an "elementary particle," but is ------- construction.

   (A) a complicated (B) a convoluted
   (C) a distorted (D) an amorphous
   (E) an illusory

3. Considering how long she had yearned to see Italy, her first reaction was curiously -------.

   (A) meditative (B) tepid
   (C) categorical (D) unoriginal
   (E) insightful

4. The successful ------- of an archaeological site requires scientific knowledge as well as cultural -------.

   (A) evolution. .awareness
   (B) revelation. .depth
   (C) reconstruction. .sensitivity
   (D) analysis. .aesthetics
   (E) synthesis. .understanding

5. As painted by Constable, the scene is not one of bucolic -------; rather it shows a striking emotional and intellectual -------.

   (A) intensity. .boredom
   (B) complacence. .detachment
   (C) serenity. .tension
   (D) vitality. .excitement
   (E) nostalgia. .placidity

6. Our times seem especially ------- to bad ideas, probably because in throwing off the shackles of tradition, we have ended up being quite ------- untested theories and untried remedies.

   (A) impervious. .tolerant of
   (B) hostile. .dependent on
   (C) hospitable. .vulnerable to
   (D) prone. .wary of
   (E) indifferent. .devoid of

7. Although he attempted repeatedly to ------- her of her conviction of his insincerity, he was not successful; she remained ------- in her judgment.

   (A) remind. .forceful
   (B) convince. .unfeigned
   (C) exorcise. .indulgent
   (D) disabuse. .adamant
   (E) free. .unsure

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. DERMATOLOGIST : SKIN :: (A) dentist : organs (B) optometrist : nerves (C) oncologist : joints (D) cardiologist : bones (E) podiatrist : feet

9. UNDERSTUDY : STAR :: (A) patient : surgeon (B) deputy : sheriff (C) secretary : executive (D) clerk : judge (E) groom : jockey

10. SUSPICIOUS : PARANOID :: (A) envious : proud (B) admiring : idolatrous (C) joyous : virtuous (D) furtive : forthright (E) vicious : deceptive

11. GREENHOUSE : PLANT :: (A) refrigerator : milk (B) well : water (C) orchard : fruit (D) incubator : infant (E) tank : fuel

12. ANACHRONISTIC : TIME ::
(A) discordant : sound
(B) dilapidated : construction
(C) disreputable : personality
(D) contagious : illness
(E) nauseating : odor

13. RIVER : GORGE :: (A) glacier : ice (B) rain : cloud (C) wind : dune (D) delta : swamp (E) lava : island

14. STIPPLE : DOT :: (A) striate : band (B) camouflage : target (C) inscribe : drawing (D) freckle : face (E) wrinkle : angle

15. GOURMAND : APPETITE :: (A) pedant : simplicity (B) skinflint : thrift (C) prodigal : energy (D) daredevil : strength (E) egotist : honesty

16. ROYALTY : PAYMENT :: (A) manuscript : page (B) gratuity : check (C) dividend : debt (D) subpoena : writ (E) client : fee

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Jean Wagner's most enduring contribution to the study of Afro-American poetry is his insistence that it be analyzed in a religious, as well as secular, frame of reference. The appropriateness of such an approach may seem self-evident for a tradition commencing with spirituals and owing its early forms, rhythms, vocabulary, and evangelical fervor to Wesleyan hymnals. But before Wagner a secular outlook that analyzed Black poetry solely within the context of political and social protest was dominant in the field.

It is Wagner who first demonstrated the essential fusion of racial and religious feeling in Afro-American poetry. The two, he argued, form a symbiotic union in which religious feelings are often applied to racial issues and racial problems are often projected onto a metaphysical plane. Wagner found this most eloquently illustrated in the Black spiritual, where the desire for freedom in this world and the hope for salvation in the next are inextricably intertwined.

17. The primary purpose of the passage is to

    (A) contrast the theories of Jean Wagner with those of other contemporary critics
    (B) document the influence of Jean Wagner on the development of Afro-American poetry
    (C) explain the relevance of Jean Wagner's work to the study of Afro-American religion
    (D) indicate the importance of Jean Wagner's analysis of Afro-American poetry
    (E) present the contributions of Jean Wagner to the study of Black spirituals

18. All of the following aspects of Afro-American poetry are referred to in the passage as having been influenced by Wesleyan hymnals EXCEPT

    (A) subject matter (B) word choice (C) rhythm (D) structure (E) tone

19. It can be inferred from the passage that, before Wagner, most students of Afro-American poetry did which of the following?

    (A) Contributed appreciably to the transfer of political protest from Afro-American poetry to direct political action.
    (B) Ignored at least some of the historical roots of Afro-American poetry.
    (C) Analyzed fully the aspects of social protest to be found in such traditional forms of Afro-American poetry as the Black spiritual.
    (D) Regarded as unimportant the development of fervent emotionalism in a portion of Afro-American poetry.
    (E) Concentrated on the complex relations between the technical elements in Afro-American poetry and its political content.

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Two relatively recent independent developments stand behind the current major research effort on nitrogen fixation, the process by which bacteria symbiotically render leguminous plants independent of nitrogen fertilizer. The one development has been the rapid, sustained increase in the price of nitrogen fertilizer. The other development has been the rapid growth of knowledge of and technical sophistication in genetic engineering. Fertilizer prices, largely tied to the price of natural gas, huge amounts of which go into the manufacture of fertilizer, will continue to represent an enormous and escalating economic burden on modern agriculture, spurring the search for alternatives to synthetic fertilizers. And genetic engineering is just the sort of fundamental breakthrough that opens up prospects of wholly novel alternatives. One such novel idea is that of inserting into the chromosomes of plants discrete genes that are not a part of the plants' natural constitution: specifically, the idea of inserting into nonleguminous plants the genes, if they can be identified and isolated, that fit the leguminous plants to be hosts for nitrogen-fixing bacteria. Hence, the intensified research on legumes.

Nitrogen fixation is a process in which certain bacteria use atmospheric nitrogen gas, which green plants cannot directly utilize, to produce ammonia, a nitrogen compound plants can use. It is one of nature's great ironies that the availability of nitrogen in the soil frequently sets an upper limit on plant growth even though the plants' leaves are bathed in a sea of nitrogen gas. The leguminous plants—among them crop plants such as soybeans, peas, alfalfa, and clover—have solved the nitrogen supply problem by entering into a symbiotic relationship with the bacterial genus *Rhizobium*; as a matter of fact, there is a specific strain of *Rhizobium* for each species of legume. The host plant supplies the bacteria with food and a protected habitat and receives surplus ammonia in exchange. Hence, legumes can thrive in nitrogen-depleted soil.

Unfortunately, most of the major food crops—including maize, wheat, rice, and potatoes—cannot. On the contrary, many of the high-yielding hybrid varieties of these food crops bred during the Green Revolution of the 1960's were selected specifically to give high yields in response to generous applications of nitrogen fertilizer. This poses an additional, formidable challenge to plant geneticists: they must work on enhancing fixation within the existing symbioses. Unless they succeed, the yield gains of the Green Revolution will be largely lost even if the genes in legumes that equip those plants to enter into a symbiosis with nitrogen fixers are identified and isolated, and even if the transfer of those gene complexes, once they are found, becomes possible. The overall task looks forbidding, but the stakes are too high not to undertake it.

20. The primary purpose of the passage is to

(A) expose the fragile nature of the foundations on which the high yields of modern agriculture rest
(B) argue that genetic engineering promises to lead to even higher yields than are achievable with synthetic fertilizers
(C) argue that the capacity for nitrogen-fixing symbioses is transferable to nonleguminous plants
(D) explain the reasons for and the objectives of current research on nitrogen-fixing symbioses
(E) describe the nature of the genes that regulate the symbiosis between legumes and certain bacteria

21. According to the passage, there is currently no strain of *Rhizobium* that can enter into a symbiosis with

(A) alfalfa (B) clover (C) maize (D) peas (E) soybeans

22. The passage implies that which of the following is true of the bacterial genus *Rhizobium*?

(A) *Rhizobium* bacteria are found primarily in nitrogen-depleted soils.
(B) Some strains of *Rhizobium* are not capable of entering into a symbiosis with any plant.
(C) Newly bred varieties of legumes cannot be hosts to any strain of *Rhizobium*.
(D) *Rhizobium* bacteria cannot survive outside the protected habitat provided by host plants.
(E) *Rhizobium* bacteria produce some ammonia for their own purposes.

23. It can be inferred from the passage that which of the following was the most influential factor in bringing about intensified research on nitrogen fixation?

(A) The high yields of the Green Revolution
(B) The persistent upward surge in natural gas prices
(C) The variety of *Rhizobium* strains
(D) The mechanization of modern agriculture
(E) The environmental ill effects of synthetic fertilizers

GO ON TO THE NEXT PAGE.

24. Which of the following situations is most closely analogous to the situation described by the author as one of nature's great ironies (lines 28-32) ?

(A) That of a farmer whose crops have failed because the normal midseason rains did not materialize and no preparations for irrigation had been made
(B) That of a long-distance runner who loses a marathon race because of a wrong turn that cost him twenty seconds
(C) That of shipwrecked sailors at sea in a lifeboat, with one flask of drinking water to share among them
(D) That of a motorist who runs out of gas a mere five miles from the nearest gas station
(E) That of travelers who want to reach their destination as fast and as cheaply as possible, but find that cost increases as travel speed increases

25. According to the passage, the ultimate goal of the current research on nitrogen fixation is to develop

(A) strains of *Rhizobium* that can enter into symbioses with existing varieties of wheat, rice, and other nonlegumes
(B) strains of *Rhizobium* that produce more ammonia for leguminous host plants than do any of the strains presently known
(C) varieties of wheat, rice, and other nonlegumes that yield as much as do existing varieties, but require less nitrogen
(D) varieties of wheat, rice, and other nonlegumes that maintain an adequate symbiotic relationship with nitrogen-fixing bacteria and produce high yields
(E) high-yielding varieties of wheat, rice, and other nonlegumes that are genetically equipped to fix nitrogen from the air without the aid of bacteria

26. The author regards the research program under discussion as

(A) original and extensive but ill-defined as to method
(B) necessary and ambitious but vulnerable to failure
(C) cogent and worthwhile but severely underfunded
(D) prohibitively expensive but conceptually elegant
(E) theoretically fascinating but practically useless

27. Most nearly parallel, in its fundamental approach, to the research program described in the passage would be a program designed to

(A) achieve greater frost resistance in frost-tender food plants by means of selective breeding, thereby expanding those plants' area of cultivation
(B) achieve greater yields from food plants by interplanting crop plants that are mutually beneficial
(C) find inexpensive and abundant natural substances that could, without reducing yields, be substituted for expensive synthetic fertilizers
(D) change the genetic makeup of food plants that cannot live in water with high salinity, using genes from plants adapted to salt water
(E) develop, through genetic engineering, a genetic configuration for the major food plants that improves the storage characteristics of the edible portion of the plants

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Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. EXTINGUISH: (A) smolder (B) defuse (C) scorch (D) ignite (E) explode

29. DWINDLE: (A) accept (B) esteem (C) exaggerate (D) combine (E) increase

30. UNEARTH: (A) conform (B) conceal (C) respect (D) blend (E) plot

31. TESTINESS: (A) devotion (B) patience (C) methodicalness (D) caution (E) discretion

32. PRECARIOUS: (A) clever (B) recent (C) anxious (D) clearly intended (E) firmly grounded

33. FETID:
(A) luminous
(B) dense
(C) having a pleasant smell
(D) having a balanced structure
(E) unable to be imitated

34. PREJUDICED: (A) straightforward (B) unmoved (C) disinterested (D) sentimental (E) even-tempered

35. TRAVESTY: (A) intentional slight (B) light burden (C) good rapport (D) assertion (E) paragon

36. PROSCRIBE: (A) predict (B) sanction (C) reciprocate (D) delineate (E) codify

37. TRUCULENT: (A) gentle (B) dim (C) dainty (D) silent (E) pure

38. IMPROBITY: (A) success (B) honesty (C) paucity (D) likelihood (E) presumption

SECTION 5

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-7

In an office, each of the nine employees—P, Q, R, S, T, U, V, W, and X—is to be assigned his or her own mailbox. The boxes, which are all the same size, are arranged in three rows of three boxes each with each box directly above and/ or below another box. The boxes are numbered from left to right—1 to 3 in the top row, 4 to 6 in the middle row, and 7 to 9 in the bottom row. The assignments are subject to the following restrictions:

P is to be assigned box 5.
Q is to be assigned the box directly above T's box.
R is to be assigned a box in the bottom row.
U is to be assigned the box directly to the left of V's box.
X is to be assigned the box directly above P's box.

1. X must be assigned box

   (A) 1 (B) 2 (C) 3 (D) 4 (E) 5

2. Which of the following groups of three people could be assigned boxes 4, 5, and 6, respectively?

   (A) P, V, and T
   (B) Q, P, and S
   (C) S, P, and T
   (D) T, Q, and P
   (E) U, P, and T

3. If W is to be assigned box 6, Q must be assigned box

   (A) 1 (B) 2 (C) 3 (D) 4 (E) 5

4. Which of the following could be the box assigned to V?

   (A) 4 (B) 5 (C) 6 (D) 7 (E) 8

5. Which of the following must be assigned a box in the middle row?

   (A) Q (B) R (C) T (D) U (E) X

6. If S is to be assigned box 3, W must be assigned box

   (A) 2 (B) 3 (C) 4 (D) 5 (E) 6

7. Which of the following could be assigned the box directly above R's box?

   (A) P (B) Q (C) S (D) U (E) V

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8. According to a newspaper article, a customs inspector believed that he could always tell if people were trying to deceive him. He based this belief on the fact that, in ten years of experience, in cases where he suspected that a tourist was carrying contraband, he was always right. Careful inspections of the luggage and persons of the suspects always turned up the contraband goods.

   Which of the following points up a logical flaw in the inspector's reasoning?

   (A) The tourists who passed through the inspector's checkpoint could have known that they might be searched.
   (B) Only a small percentage of the tourists passing through the inspector's checkpoint could be expected to be intentionally carrying contraband.
   (C) Other customs inspectors at the same checkpoint caught tourists carrying contraband just as often as this inspector did.
   (D) Some tourists whom the inspector decided not to search could have knowingly carried contraband.
   (E) Some tourists who passed through the checkpoint without being searched could have been carrying contraband unwittingly.

9. In any negotiations between a party with limited aims and an opposing party with unlimited aims, the party with limited aims is bound to lose. This is so because the scope of a negotiating party's aims determines the energy and the perseverance that will be brought to the negotiations by that party.

   Which of the following is an assumption implicit in the passage above?

   (A) The intensity with which parties conduct negotiations affects the outcome of those negotiations.
   (B) Negotiations almost always pit against one another parties whose aims differ in scope.
   (C) The outcome of negotiations cannot be correctly predicted in advance.
   (D) A negotiator who has exceptionally high aims needs exceptional perseverance in order to avoid losing.
   (E) Negotiating parties are typically not aware of the scope of each other's aims until the outcome is no longer in doubt.

10. In a recent study, sedentary middle-aged men who drink more than two cups of coffee a day were found more likely than other sedentary middle-aged men to have a high blood level of cholesterol, which is a factor increasing risk of heart disease. Cholesterol can reach the blood from food and drink but is not contained in coffee.

    Which of the following, if true, most seriously weakens a conclusion from the study that for sedentary middle-aged men coffee increases the risk of heart attack?

    (A) A sedentary style of life increases levels of cholesterol in the blood.
    (B) Coffee contains caffeine, which acts as a stimulant that increases heart rate.
    (C) The men studied drank their coffee without milk or cream, which contain cholesterol.
    (D) In both groups, the men were likely to be overweight, and excess weight is a factor that increases risk of heart disease.
    (E) The men who drank more than two cups of coffee a day also ate more foods high in cholesterol.

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Questions 11-16

A gallery owner is preparing to exhibit examples of an artist's painting and sculpture. The artist has submitted one large sculpture, one small sculpture, two large paintings, and three small paintings. The gallery owner plans to show at least three, but no more than five, works selected according to the following conditions:

At least one sculpture must be selected.
At least one large work must be selected.
The three large works cannot all be selected.
The four small works cannot all be selected.
If the small sculpture is selected, at least one small painting must also be selected.

11. Which of the following could be a complete selection for the exhibit?

(A) Three small paintings
(B) The two large paintings and two small paintings
(C) The small sculpture and two small paintings
(D) The small sculpture, a large painting, and two small paintings
(E) The large sculpture, the two large paintings, and one small painting

12. If the only sculpture selected for the exhibit is the large sculpture, which of the following must be true?

(A) Exactly three additional works are selected.
(B) The additional works selected are all small paintings.
(C) One of the large paintings is selected along with exactly three small paintings.
(D) Either two or more small paintings are selected, or one large painting and at least one small painting are selected.
(E) Either two small paintings and one of the large paintings are selected, or exactly three small paintings are selected.

13. If five works are selected for the exhibit, which of the following must be true?

(A) Exactly two of the works selected are large.
(B) Exactly three small paintings are selected.
(C) Exactly four of the works selected are small.
(D) Both sculptures are selected.
(E) Only one of the two large paintings is selected.

14. If three small paintings are selected for the exhibit, which of the following must also be selected?

(A) The small sculpture
(B) The large sculpture
(C) One large painting
(D) One large painting and the large sculpture
(E) One large painting and the small sculpture

15. If the small sculpture and one of the large paintings are selected, an acceptable exhibit can be made by the addition of each of the following selections EXCEPT

(A) one small painting
(B) two small paintings
(C) the other large painting
(D) the other large painting and one small painting
(E) the other large painting and two small paintings

16. If both sculptures are selected, an acceptable exhibit can be made by the addition of each of the following selections EXCEPT

(A) one small painting
(B) two small paintings
(C) three small paintings
(D) one large painting and one small painting
(E) one large painting and two small paintings

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Questions 17-22

K, L, M, N, O, and P were the finalists in a spelling bee. There were exactly twenty words to be spelled. Each of the contestants attempted to spell all twenty words. For each of the twenty words a contestant spelled correctly, the contestant obtained one point. For each word a contestant spelled incorrectly, one point was deducted from the contestant's score. (It was thus possible for a contestant to have a negative final score.)

No two contestants obtained the same final score.
K obtained a higher score than L did and a lower score than M did.
N obtained a higher score than M did.
P obtained a higher score than K did and a lower score than O did.

17. Which of the following must be the contestant with the lowest final score?

(A) K (B) L (C) M (D) O (E) P

18. If N had a lower final score than P did, which of the following must have had the next-to-the-highest final score?

(A) K (B) M (C) N (D) O (E) P

19. The exact order of the six contestants in the final-score standings could be determined if which of the following were known to be true?

(A) M had a higher final score than O did.
(B) M had a higher final score than P did.
(C) N had a higher final score than P did.
(D) O had a higher final score than M did.
(E) O had a higher final score than N did.

20. If none of the contestants spelled the two hardest words correctly, the highest final score that any contestant could have obtained is

(A) 18
(B) 17
(C) 16
(D) 15
(E) 14

21. If the contestant with the next-to-lowest score had a final score of zero, the lowest final score that could have been the winning score was

(A) 14
(B) 12
(C) 10
(D) 8
(E) 6

22. If each of the contestants spelled the first fifteen words correctly, and if O finished immediately ahead of M in the final-score standings, which of the following must be the contestant whose final score was sixteen?

(A) K (B) M (C) N (D) O (E) P

GO ON TO THE NEXT PAGE.

23. A package is never accepted for delivery by the delivery service unless it is within the established size limits. All packages accepted for delivery by the delivery service have a return address.

If the statements above are true, which of the following must also be true?

(A) The delivery service charges more for heavier packages than for lighter packages.
(B) The delivery service will always accept for delivery a package that is within the established size limits.
(C) If a package is within the established size limits and has a return address, it will be accepted for delivery by the delivery service no matter how heavy the package is.
(D) A package that is not within the established size limits but has a return address is never accepted for delivery by the delivery service.
(E) The delivery service does not charge for packages that must be returned to the sender.

24. The pattern of scientific grants awarded by foundations is changing as the number of worthy requests grows in the face of cuts in federal spending. Many foundations, formerly willing to fund innovative but risky projects, have begun to support relatively conservative projects only.

From the passage above it can be most reasonably concluded that which of the following was true when the passage was written, as compared to preceding years?

(A) Foundations were being forced to recognize that they could be more effective by granting smaller amounts of money to a greater number of projects.
(B) The decision-makers at foundations tended to be more politically conservative.
(C) Foundations had less money available to support worthwhile projects because of the rising costs of other activities.
(D) Foundations were increasingly allowing decisions about which projects to fund to be based on a reluctance to see projects they supported fail.
(E) Those programs that were more innovative than the ones funded by foundations were supported by the limited federal funds that were still available.

25. The Wheat Farmers Alliance, a political action committee, attracts 70 percent of its contributors from an advertisement requesting contributions placed only in the September, October, and November issues of the *Grange Report*, a monthly newsletter for wheat farmers. The president of the Wheat Farmers Alliance, to increase the number of contributors, decides to advertise in each of the monthly issues of the *Grange Report*. She expects that, as a result of the additional *Grange Report* advertisements, the number of contributors will be increased to at least double the present number.

Which of the following, if true, would most strongly support the president's expectation?

(A) The September, October, and November advertisements were noticed by fewer than one-third of those readers of the *Grange Report* who would be willing to contribute to the Wheat Farmers Alliance.
(B) Wheat farmers traditionally repay their bank loans in late summer after the winter wheat crop has been harvested and sold.
(C) The majority of the readers of the *Grange Report* with a great enough interest in the Wheat Farmers Alliance to contribute have already responded to the advertisements.
(D) Most of those who contribute to the Wheat Farmers Alliance in the course of a year do so in response to advertisements in the *Grange Report*.
(E) The total number of readers of the *Grange Report* is stable from year to year.

SECTION 6

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

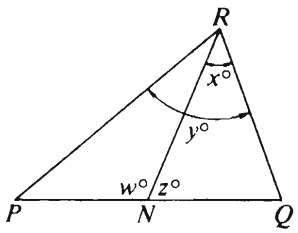
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	$x^2 = 3$ $y = 2$	
1.	x	y

At a grocery store Ray paid \$1.85 for 5 pounds of potatoes and \$1.29 for 3 pounds of apples.

2.	The amount Ray paid per pound for the potatoes	The amount Ray paid per pound for the apples

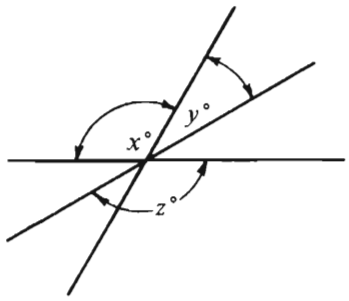
	$ab \neq 0$	
3.	$\frac{a+b}{a}$	$\frac{a+b}{b}$
4.	$\frac{11}{20}$	0.54

Triangle A has vertices (0,0), (0,4), and (3,0), and triangle B has vertices (0,0), $(-3,0)$, and $(0,-4)$.

5.	The area of A	The area of B

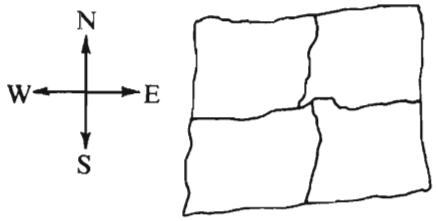
	$x + 2 = 3 - x$	
6.	x	1

	Column A	Column B



The three lines above intersect at a single point.

7.	$z - y$	x
8.	$\frac{1}{5}$	$\frac{1}{5} - \frac{1}{6} + \frac{1}{7} - \frac{1}{8} + \frac{1}{9}$



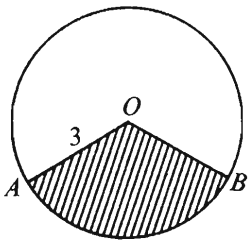
A precinct is divided into four wards as shown. The two northern wards have exactly 30 Democrats each and the two eastern wards have an average (arithmetic mean) of 35 Democrats per ward.

9.	The average (arithmetic mean) number of Democrats in the two southern wards	25

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

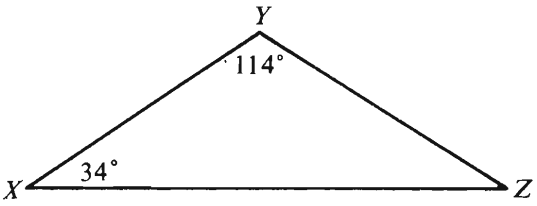
Column A	Column B



O is the center of the circle. The area of the shaded region is 3π.

10. The degree measure of $\angle AOB$ | 120

11. $(0.4)^6$ | $(1 - 0.6)^4$



12. The length of XY | The length of YZ

Column A	Column B

k is a digit in the decimal $1.3k5$, and $1.3k5$ is less than 1.32.

13. k | 1

14. $(2\sqrt{7} + 3)(2\sqrt{7} - 3)$ | 19

John has a flat square garden with a perimeter of x feet. David has a flat rectangular garden with a perimeter of x feet and the length 1 foot longer than the width.

15. The area of John's garden | The area of David's garden

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. If $2x + y = 10$ and $2x = 4$, then $y =$

(A) 2 (B) 6 (C) 7 (D) 8 (E) 14

17. $\dfrac{\frac{4}{3}}{3} =$

(A) $\frac{1}{4}$ (B) 3 (C) 4 (D) 12 (E) 36

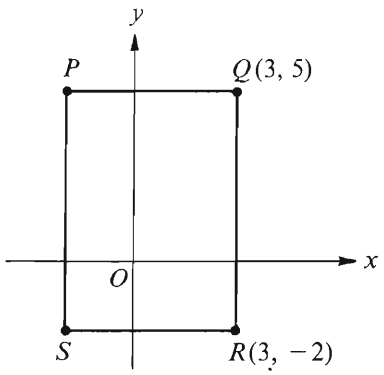
18. The illumination E, in footcandles, provided by a light source of intensity I, in candles, at a distance D, in feet, is given by $E = \dfrac{I}{D^2}$. For an illumination of 50 footcandles at a distance of 4 feet from a source, the intensity of the source must be

(A) 50 candles
(B) 200 candles
(C) 800 candles
(D) 1,600 candles
(E) 2,500 candles

$$\begin{array}{r} 4 \\ 896\overline{)3{,}59\square} \\ \underline{3{,}58\triangle} \\ 6 \end{array}$$

19. If the solution of the division problem above is correct, what digit does $\square$ represent?

(A) 6 (B) 4 (C) 2 (D) 1 (E) 0



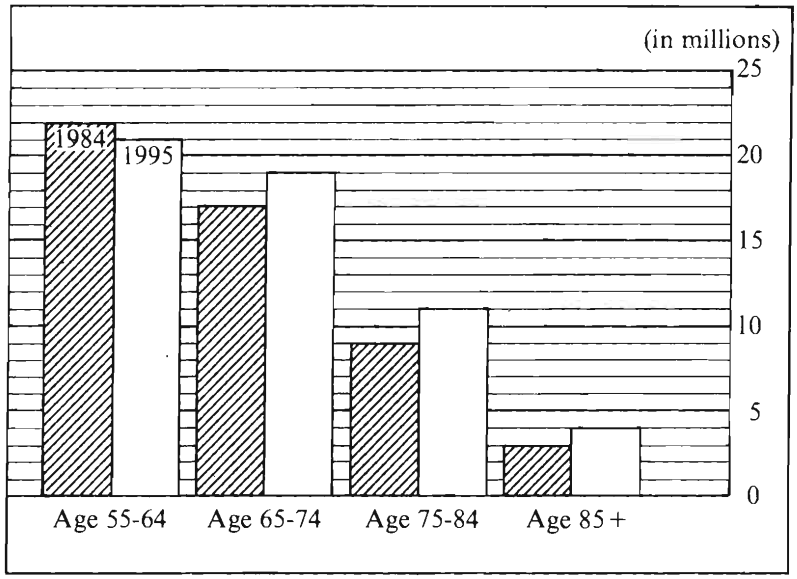
20. In the rectangular coordinate system above, if the area of rectangular region $PQRS$ is 35, what are the coordinates of point P ?

(A) $(-2, -2)$
(B) $(-2, 5)$
(C) $(-3, 5)$
(D) $(-4, 5)$
(E) It cannot be determined from the information given.

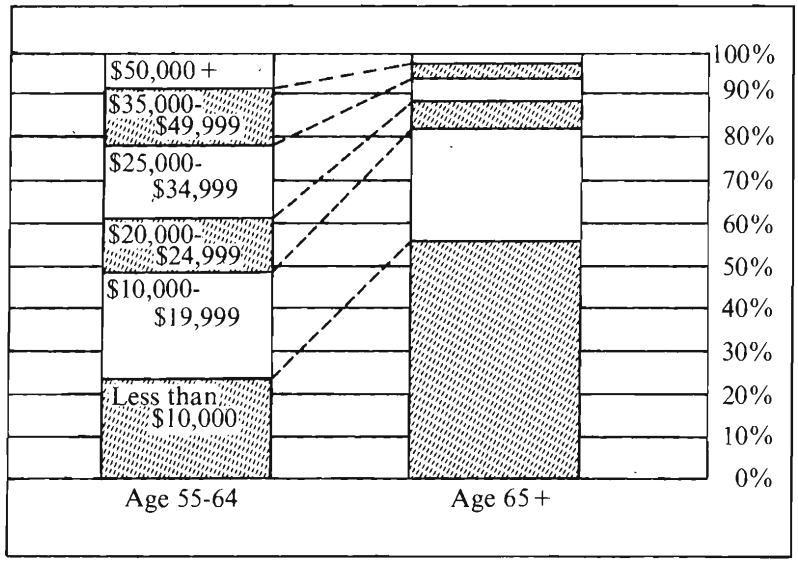
GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graphs.

POPULATION OF THE UNITED STATES AGE 55 AND OVER,
1984 AND PROJECTIONS FOR 1995



INCOME DISTRIBUTION FOR
POPULATION AGE 55 AND OVER, 1984



Note: Drawn to scale.

GO ON TO THE NEXT PAGE.

21. The age category that is projected to decrease from 1984 to 1995 is projected to have approximately how many million people in 1995 ?

(A) 17 (B) 18 (C) 21 (D) 23 (E) 24

22. In 1984 the median income for a person in the 55-64 age category was in which of the following intervals?

(A) Less than $10,000
(B) $10,000—$19,999
(C) $20,000—$24,999
(D) $25,000—$34,999
(E) $35,000—$49,999

23. If it is projected that the population age 55 and over will comprise $\frac{1}{5}$ of the total population in 1995, then the total population is projected to be approximately how many million in 1995 ?

(A) 275 (B) 260 (C) 250
(D) 245 (E) 220

24. In 1984 approximately how many more people age 55-64 had incomes less than $10,000 than had incomes of $50,000 or more?

(A) 2.2 million
(B) 3.3 million
(C) 4.4 million
(D) 5.5 million
(E) 11.0 million

25. For the age category that is projected to have the largest percent increase from 1984 to 1995, approximately what is the projected percent increase in population?

(A) 10% (B) 15% (C) 20%
(D) 25% (E) 35%

GO ON TO THE NEXT PAGE.

26. $\frac{3^3 - 3^2}{3} =$

(A) 0 (B) 1 (C) 3 (D) 6 (E) 9

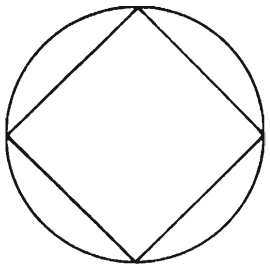
27. A certain rectangle has perimeter 54. If the ratio of the length of the rectangle to the width is 5 to 4, what is the length of the rectangle?

(A) 30 (B) 27 (C) 24 (D) 18 (E) 15

28. The expression $(x + 4)(2x - 3)$ is equivalent to which of the following?

I. $2x(x + 4) - 3(x + 4)$
II. $(x - 4)(2x + 3)$
III. $2x^2 - 12$

(A) I only (B) II only (C) III only
(D) II and III only (E) I, II, and III



29. In the figure above, what is the area of the square inscribed in the circle of radius a ?

(A) $2a$ (B) $\sqrt{2}a^2$ (C) a^2
(D) $2a^2$ (E) $4a^2$

30. A certain form letter is to be sent to prospective customers. If 4 model-X computers working independently can do a combined total of 4 of the letters in 4 minutes, then 100 model-X computers working independently can do a combined total of 100 of the letters in exactly how many minutes?

(A) 4 min
(B) 10 min
(C) 25 min
(D) 40 min
(E) 100 min

FOR GENERAL TEST 15 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 2			Section 4		
Number	Answer	P+	Number	Answer	P+
1	B	88	1	D	85
2	C	79	2	A	85
3	E	73	3	B	75
4	C	58	4	C	49
5	C	75	5	C	54
6	E	30	6	C	49
7	E	32	7	D	47
8	E	90	8	E	90
9	B	87	9	B	73
10	D	72	10	B	70
11	D	55	11	D	67
12	D	59	12	A	62
13	A	50	13	C	42
14	E	36	14	A	47
15	A	32	15	B	39
16	D	8	16	D	25
17	C	46	17	D	51
18	A	68	18	A	47
19	C	77	19	B	33
20	A	61	20	D	63
21	A	35	21	C	92
22	C	62	22	E	21
23	E	43	23	B	57
24	C	65	24	C	50
25	D	45	25	D	38
26	A	43	26	B	68
27	D	38	27	D	38
28	B	90	28	D	91
29	C	89	29	E	84
30	D	80	30	B	81
31	E	77	31	B	79
32	D	74	32	E	62
33	B	51	33	C	61
34	B	50	34	C	33
35	C	28	35	E	31
36	E	34	36	B	25
37	E	21	37	A	29
38	C	14	38	B	20

QUANTITATIVE ABILITY					
Section 3			Section 6		
Number	Answer	P+	Number	Answer	P+
1	B	89	1	B	85
2	A	93	2	B	87
3	B	86	3	D	82
4	C	92	4	A	84
5	A	88	5	C	82
6	A	80	6	B	77
7	A	79	7	C	72
8	C	63	8	A	73
9	B	59	9	D	69
10	A	64	10	C	61
11	D	54	11	B	50
12	C	69	12	B	65
13	D	63	13	D	47
14	B	40	14	C	45
15	B	28	15	A	27
16	D	83	16	B	94
17	A	83	17	C	95
18	B	77	18	C	82
19	B	79	19	E	80
20	D	69	20	B	73
21	B	93	21	C	95
22	D	73	22	C	72
23	A	47	23	A	58
24	E	33	24	B	32
25	C	36	25	E	19
26	C	67	26	D	73
27	D	63	27	E	50
28	E	44	28	A	59
29	C	33	29	D	42
30	E	28	30	A	33

ANALYTICAL ABILITY					
Section 1			Section 5		
Number	Answer	P+	Number	Answer	P+
1	A	89	1	B	95
2	D	76	2	C	74
3	B	65	3	A	74
4	C	68	4	E	81
5	D	64	5	C	73
6	C	71	6	E	81
7	D	62	7	C	72
8	E	67	8	D	68
9	E	88	9	A	59
10	B	93	10	E	54
11	E	54	11	D	84
12	B	81	12	D	40
13	A	44	13	A	43
14	B	63	14	B	53
15	A	63	15	C	60
16	E	64	16	C	70
17	A	53	17	B	87
18	B	52	18	E	52
19	B	26	19	A	38
20	E	30	20	C	48
21	D	21	21	D	25
22	D	28	22	B	22
23	A	48	23	D	46
24	C	23	24	D	39
25	B	22	25	A	25

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 15 ONLY AND THE PERCENTS BELOW*

	Scaled Scores and Percents Below*							Scaled Scores and Percents Below*					
Raw Score	Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below	Raw Score	Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below
73-76	800	99					40	450	42	560	50	690	89
72	790	99					39	440	39	540	45	680	87
71	780	99					38	430	36	530	43	660	84
70	770	99					37	420	34	520	40	650	82
69	760	99					36	420	34	510	38	630	77
68	740	98					35	410	30	500	35	620	75
67	730	97					34	400	27	490	33	600	70
66	720	96					33	390	25	480	30	590	68
65	710	96					32	380	23	460	26	570	62
64	700	95					31	370	21	450	24	560	59
63	680	93					30	370	21	440	22	540	53
62	670	92					29	360	17	430	20	530	51
61	660	91					28	350	15	420	18	510	44
60	650	89	800	98			27	350	15	400	15	500	42
59	640	88	800	98			26	340	13	390	13	480	36
58	630	86	800	98			25	330	11	380	12	470	33
57	620	84	790	97			24	320	10	370	10	450	28
56	610	83	780	95			23	310	8	360	9	440	25
55	600	81	760	93			22	300	7	350	8	420	21
54	590	79	750	90			21	290	5	340	7	410	19
53	580	77	730	87			20	280	4	320	5	390	15
52	570	75	720	85			19	270	3	310	4	380	13
51	550	70	710	83			18	260	2	300	3	360	10
50	540	67	690	79	800	99	17	250	2	290	3	350	9
49	540	67	680	77	800	99	16	240	1	270	2	340	8
48	530	65	660	73	800	99	15	230	1	260	1	320	6
47	520	62	650	71	800	99	14	220	1	240	1	310	5
46	510	59	640	69	780	98	13	210	0	230	1	290	3
45	500	57	620	64	770	97	12	210	0	210	0	280	3
44	490	54	610	62	750	96	11	200	0	200	0	260	2
43	480	51	600	60	740	95	10	200	0	200	0	250	1
42	470	48	580	55	720	93	9	200	0	200	0	230	1
41	460	45	570	52	710	91	8	200	0	200	0	220	0
							7	200	0	200	0	200	0
							0-6	200	0	200	0	200	0

*Percent scoring below the scaled score based on the performance of the 876,691 examinees who took the General Test between October 1, 1985, and September 30, 1988.

TEST 16

SECTION 1

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Dreams are ------ in and of themselves, but, when combined with other data, they can tell us much about the dreamer.

   (A) uninformative
   (B) startling
   (C) harmless
   (D) unregulated
   (E) uncontrollable

2. The Muses are ------ deities: they avenge themselves without mercy on those who weary of their charms.

   (A) rueful (B) ingenuous (C) solicitous (D) vindictive (E) dispassionate

3. Without the psychiatrist's promise of confidentiality, trust is ------ and the patient's communication limited; even though confidentiality can thus be seen to be precious in therapy, moral responsibility sometimes requires a willingness to ------ it.

   (A) implicit..extend
   (B) ambiguous..apply
   (C) prevented..uphold
   (D) assumed..examine
   (E) impaired..sacrifice

4. Having fully embraced the belief that government by persuasion is preferable to government by ------, the leaders of the movement have recently ------ most of their previous statements supporting totalitarianism.

   (A) intimidation..issued
   (B) participation..moderated
   (C) proclamation..codified
   (D) demonstration..deliberated
   (E) coercion..repudiated

5. The powers and satisfactions of primeval people, though few and meager, were ------ their few and simple desires.

   (A) simultaneous with
   (B) commensurate with
   (C) substantiated by
   (D) circumscribed by
   (E) ruined by

6. Some scientists argue that carbon compounds play such a central role in life on Earth because of the possibility of ------ resulting from the carbon atom's ability to form an unending series of different molecules.

   (A) deviation
   (B) stability
   (C) reproduction
   (D) variety
   (E) invigoration

7. Whereas the art critic Vasari saw the painting entitled the *Mona Lisa* as an original and wonderful ------- feat, the reproduction of a natural object, the aesthetes saw it as ------ that required deciphering.

   (A) collaborative..an aberration
   (B) historical..a symbol
   (C) technical..a hieroglyph
   (D) mechanical..an imitation
   (E) visual..an illusion

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. REFLECTION:LIGHT :: (A) emotion:feeling (B) echo:sound (C) film:scene (D) microphone:hearing (E) iris:vision

9. CARVE:TURKEY :: (A) slice:cake (B) peel:peach (C) mince:onion (D) core:apple (E) stew:prune

10. GEM:TURQUOISE :: (A) stone:magenta (B) flower:violet (C) pear:orange (D) lettuce:green (E) vine:cherry

11. PARQUET:WOOD :: (A) potpourri:medley (B) collage:tapestry (C) color:painting (D) linoleum:marble (E) mosaic:glass

12. IMPLACABLE:APPEASE ::
(A) impregnable:defy
(B) inconsistent:persuade
(C) indomitable:subdue
(D) imperturbable:mollify
(E) intractable:understand

13. HOMOGENIZATION:UNIFORM ::
(A) coagulation:brittle
(B) combustion:flammable
(C) digestion:edible
(D) putrefaction:rotten
(E) fermentation:liquid

14. SELFLESSNESS:ALTRUIST ::
(A) pragmatism:philanthropist
(B) expertise:connoisseur
(C) indiscretion:misanthrope
(D) enthusiasm:dilettante
(E) imperviousness:fanatic

15. AESTHETICS:BEAUTY ::
(A) ethics:etiquette
(B) epistemology:knowledge
(C) logistics:truth
(D) rhetoric:reasoning
(E) theology:morals

16. CORNUCOPIA:ABUNDANCE :: (A) fortune:success (B) mace:authority (C) ensign:ship (D) unicorn:myth (E) medal:badge

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Whether the languages of the ancient American peoples were used for expressing abstract universal concepts can be clearly answered in the case of Nahuatl. Nahuatl, like Greek and German, is a language that allows the formation of extensive compounds. By the combination of radicals or semantic elements, single compound words can express complex conceptual relations, often of an abstract universal character.

The *tlamatinime* ("those who know") were able to use this rich stock of abstract terms to express the nuances of their thought. They also availed themselves of other forms of expression with metaphorical meaning, some probably original, some derived from Toltec coinages. Of these forms the most characteristic in Nahuatl is the juxtaposition of two words that, because they are synonyms, associated terms, or even contraries, complement each other to evoke one single idea. Used as metaphor, the juxtaposed terms connote specific or essential traits of the being they refer to, introducing a mode of poetry as an almost habitual form of expression.

17. A main purpose of the passage is to
    (A) delineate the function of the *tlamatinime* in Nahuatl society
    (B) explain the abstract philosophy of the Nahuatl thinkers
    (C) argue against a theory of poetic expression by citing evidence about the Nahuatl
    (D) explore the rich metaphorical heritage the Nahuatl received from the Toltecs
    (E) describe some conceptual and aesthetic resources of the Nahuatl language

18. According to the passage, some abstract universal ideas can be expressed in Nahuatl by
    (A) taking away from a word any reference to particular instances
    (B) removing a word from its associations with other words
    (C) giving a word a new and opposite meaning
    (D) putting various meaningful elements together in one word
    (E) turning each word of a phrase into a poetic metaphor

19. It can be inferred solely from the information in the passage that
    (A) there are many languages that, like Greek or German, allow extensive compounding
    (B) all abstract universal ideas are ideas of complex relations
    (C) some record or evidence of the thought of the *tlamatinime* exists
    (D) metaphors are always used in Nahuatl to express abstract conceptual relationships
    (E) the abstract terms of the Nahuatl language are habitually used in poetry

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Many theories have been formulated to explain the role of grazers such as zooplankton in controlling the amount of planktonic algae (phytoplankton) in lakes. The first theories of such grazer control were merely based on observations of negative correlations between algal and zooplankton numbers. A low number of algal cells in the presence of a high number of grazers suggested, but did not prove, that the grazers had removed most of the algae. The converse observation, of the absence of grazers in areas of high phytoplankton concentration, led Hardy to propose his principle of animal exclusion, which hypothesized that phytoplankton produced a repellent that excluded grazers from regions of high phytoplankton concentration. This was the first suggestion of algal defenses against grazing.

Perhaps the fact that many of these first studies considered only algae of a size that could be collected in a net (net phytoplankton), a practice that overlooked the smaller phytoplankton (nannoplankton) that we now know grazers are most likely to feed on, led to a de-emphasis of the role of grazers in subsequent research. Increasingly, as in the individual studies of Lund, Round, and Reynolds, researchers began to stress the importance of environmental factors such as temperature, light, and water movements in controlling algal numbers. These environmental factors were amenable to field monitoring and to simulation in the laboratory. Grazing was believed to have some effect on algal numbers, especially after phytoplankton growth rates declined at the end of bloom periods, but grazing was considered a minor component of models that predicted algal population dynamics.

The potential magnitude of grazing pressure on freshwater phytoplankton has only recently been determined empirically. Studies by Hargrave and Geen estimated natural community grazing rates by measuring feeding rates of individual zooplankton species in the laboratory and then computing community grazing rates for field conditions using the known population density of grazers. The high estimates of grazing pressure postulated by these researchers were not fully accepted, however, until the grazing rates of zooplankton were determined directly in the field, by means of new experimental techniques. Using a specially prepared feeding chamber, Haney was able to record zooplankton grazing rates in natural field conditions. In the periods of peak zooplankton abundance, that is, in the late spring and in the summer, Haney recorded maximum daily community grazing rates, for nutrient-poor lakes and bog lakes, respectively, of 6.6 percent and 114 percent of daily phytoplankton production. Cladocerans had higher grazing rates than copepods, usually accounting for 80 percent of the community grazing rate. These rates varied seasonally, reaching the lowest point in the winter and early spring. Haney's thorough research provides convincing field evidence that grazers can exert significant pressure on phytoplankton population.

20. The author most likely mentions Hardy's principle of animal exclusion in order to
    (A) give an example of one theory about the interaction of grazers and phytoplankton
    (B) defend the first theory of algal defenses against grazing
    (C) support the contention that phytoplankton numbers are controlled primarily by environmental factors
    (D) demonstrate the superiority of laboratory studies of zooplankton feeding rates to other kinds of studies of such rates
    (E) refute researchers who believed that low numbers of phytoplankton indicated the grazing effect of low numbers of zooplankton

21. It can be inferred from the passage that the "first theories" of grazer control mentioned in line 4 would have been more convincing if researchers had been able to
    (A) observe high phytoplankton numbers under natural lake conditions
    (B) discover negative correlations between algae and zooplankton numbers from their field research
    (C) understand the central importance of environmental factors in controlling the growth rates of phytoplankton
    (D) make verifiable correlations of cause and effect between zooplankton and phytoplankton numbers
    (E) invent laboratory techniques that would have allowed them to bypass their field research concerning grazer control

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22. Which of the following, if true, would call into question Hardy's principle of animal exclusion?

(A) Zooplankton are not the only organisms that are affected by phytoplankton repellents.
(B) Zooplankton exclusion is unrelated to phytoplankton population density.
(C) Zooplankton population density is higher during some parts of the year than during others.
(D) Net phytoplankton are more likely to exclude zooplankton than are nanno-plankton.
(E) Phytoplankton numbers can be strongly affected by environmental factors.

23. The author would be likely to agree with which of the following statements regarding the pressure of grazers on phytoplankton numbers?

I. Grazing pressure can vary according to the individual type of zooplankton.
II. Grazing pressure can be lower in nutrient-poor lakes than in bog lakes.
III. Grazing tends to exert about the same pressure as does temperature.

(A) I only (B) III only (C) I and II only
(D) II and III only (E) I, II, and III

24. The passage supplies information to indicate that Hargrave and Geen's conclusion regarding the grazing pressure exerted by zooplankton on phytoplankton numbers was most similar to the conclusion regarding grazing pressure reached by which of the following researchers?

(A) Hardy (B) Lund (C) Round
(D) Reynolds (E) Haney

25. It can be inferred from the passage that one way in which many of the early researchers on grazer control could have improved their data would have been to

(A) emphasize the effects of temperature, rather than of light, on phytoplankton
(B) disregard nannoplankton in their analysis of phytoplankton numbers
(C) collect phytoplankton of all sizes before analyzing the extent of phytoplankton concentration
(D) recognize that phytoplankton other than net phytoplankton could be collected in a net
(E) understand the crucial significance of net phytoplankton in the diet of zooplankton

26. According to the passage, Hargrave and Geen did which of the following in their experiments?

(A) They compared the grazing rates of individual zooplankton species in the laboratory with the natural grazing rates of these species.
(B) They hypothesized about the population density of grazers in natural habitats by using data concerning the population density of grazers in the laboratory.
(C) They estimated the community grazing rates of zooplankton in the laboratory by using data concerning the natural community grazing rates of zooplankton.
(D) They estimated the natural community grazing rates of zooplankton by using data concerning the known population density of phytoplankton.
(E) They estimated the natural community grazing rates of zooplankton by using laboratory data concerning the grazing rates of individual zooplankton species.

27. Which of the following is a true statement about the zooplankton numbers and zooplankton grazing rates observed in Haney's experiments?

(A) While zooplankton numbers began to decline in August, zooplankton grazing rates began to increase.
(B) Although zooplankton numbers were high in May, grazing rates did not become high until January.
(C) Both zooplankton numbers and grazing rates were higher in December than in November.
(D) Both zooplankton numbers and grazing rates were lower in March than in June.
(E) Both zooplankton numbers and grazing rates were highest in February.

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Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. EXCESSIVE: (A) too soon
(B) too little (C) with care
(D) of interest (E) on demand

29. VICTOR: (A) victim (B) enemy
(C) opponent (D) underling (E) loser

30. AUDACIOUS: (A) timid
(B) mute (C) visible
(D) disciplined (E) cultivated

31. AUTONOMY:
(A) friendliness
(B) dependence
(C) recalcitrance
(D) receptiveness to change
(E) lack of principles

32. EXTEMPORANEOUS: (A) additional
(B) skillful (C) planned
(D) confined (E) calm

33. DISTEND: (A) constrict
(B) concentrate (C) deteriorate
(D) fold (E) weaken

34. ASSUAGE: (A) generate
(B) intensify (C) segregate
(D) disjoin (E) extract

35. CLINCH: (A) treat gently
(B) divide carelessly (C) grow less weary
(D) make more doubtful (E) lose sight of

36. PROFLIGACY: (A) frugality
(B) paucity (C) insensitivity
(D) legitimacy (E) tenacity

37. PUISSANCE: (A) powerlessness
(B) baseness (C) liberality
(D) skepticism (E) knowledge

38. RAVE: (A) flak (B) flop
(C) cant (D) pan (E) snub

SECTION 2

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

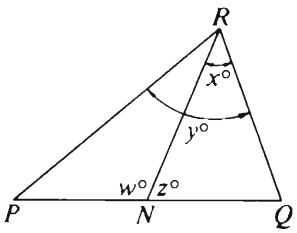
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

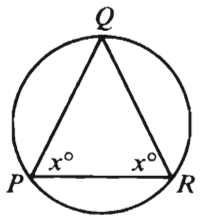
GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	0.0230102301	0.023023

A purchase plan for a stereo receiver requires 20 percent of the total cost as a down payment and monthly payments of $30.

2.	The total cost of the stereo receiver	$450

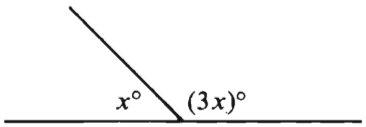


$\triangle PQR$ is inscribed in a circle.

3.	PQ	QR

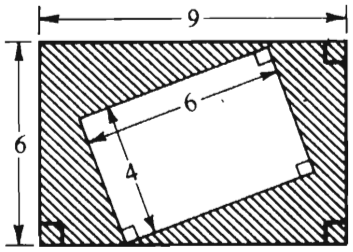
$m + 2 = 8$
$r - 2 = 7$

4.	$4[(m + 2) + (r - 2)]$	$(m + 2)(r - 2)$



5.	$4x$	179

	Column A	Column B
6.	$\sqrt{82,531}$	300



7.	The area of the shaded region	30

8.	$\frac{1}{4} + \frac{1}{5}$	$\frac{1}{3} + \frac{1}{7}$

On a 50-question multiple-choice test, 3 points were given for each question answered correctly and 1 point was deducted for each question answered incorrectly. A student who answered all of the questions on the test received a total of 98 points.

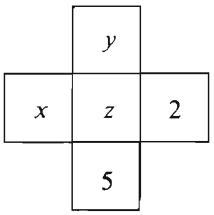
9.	The number of questions on the test that the student answered incorrectly	14

10.	$(0.4)^3$	$(0.2)^6$

GO ON TO THE NEXT PAGE.

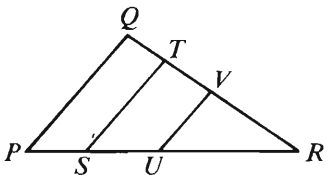
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	$3 \leqq x \leqq 5$ $6 \leqq y \leqq 10$	
11.	The average (arithmetic mean) of x and y	5
12.	The length of a diagonal of a square with side of length s	The length of a diameter of a circle with radius s



The sum of the three numbers in the horizontal row equals the sum of the three numbers in the vertical column.

	Column A	Column B
13.	x	y

	Column A	Column B
	 $PQ \parallel ST \parallel UV$	
14.	The area of triangular region RUV plus the area of triangular region RST	The area of triangular region RPQ
15.	$\frac{2x+1}{4} - \frac{x-1}{8} = \frac{x-1}{4} - \frac{2x+1}{8}$	
	$2x + 1$	$x - 1$

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Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

---

16. If $\frac{1}{4}$ of a certain number is 2, then $\frac{1}{2}$ of the number is

    (A) $\frac{1}{8}$ (B) $\frac{1}{4}$ (C) 1 (D) 4 (E) 8

17. $2.34 - 2\frac{1}{5} =$

    (A) 0.09 (B) 0.14 (C) 0.19
    (D) 0.29 (E) 0.32

18. If $n - \frac{6}{11} = \frac{5}{11}$, then $n =$

    (A) 11 (B) 1 (C) $\frac{1}{11}$
    (D) $-\frac{1}{11}$ (E) -11

19. The charge for a telephone call made at 10:00 a.m. from City Y to City X is \$0.50 for the first minute and \$0.34 for each additional minute. At these rates, what is the difference between the total cost of three 5-minute calls and the cost of one 15-minute call?

    (A) \$0.00
    (B) \$0.16
    (C) \$0.32
    (D) \$0.48
    (E) \$1.00

20. The lengths of the sides of a triangle are in the ratio of 3 to 5 to 6. If the perimeter of the triangle is 70, what is the length of the longest side?

    (A) 5 (B) 6 (C) 15 (D) 25 (E) 30

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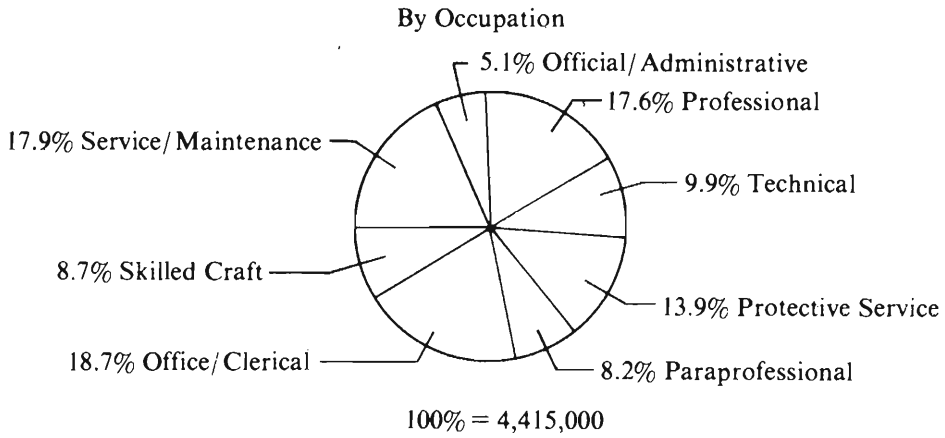
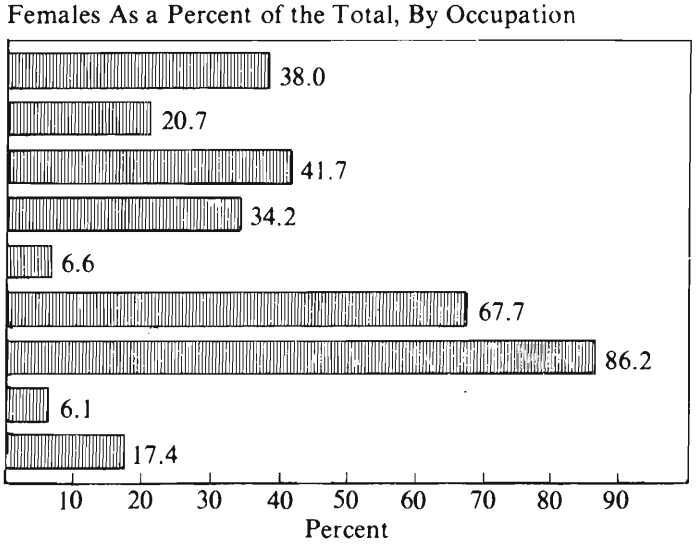
Questions 21-25 refer to the following data.

STATE AND LOCAL GOVERNMENT EMPLOYMENT AND SALARY, BY OCCUPATION AND SEX, 1977



Median Annual Salary		
Male	Female	
$12,390	$ 9,093	All Occupations
18,723	14,066	Official/Administrative
15,740	12,650	Professional
12,885	9,445	Technical
13,622	9,827	Protective Service
9,054	7,761	Paraprofessional
9,723	8,456	Office/Clerical
11,657	8,892	Skilled Craft
9,547	7,307	Service/Maintenance



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21. Approximately what percent of state and local government employees were male?

(A) 38% (B) 52% (C) 58%
(D) 62% (E) 80%

22. State and local governments employed approximately how many more office/clerical employees than skilled craft employees?

(A) 384,000
(B) 441,500
(C) 650,500
(D) 825,600
(E) 1,209,700

23. For state and local government employees, the median annual salary for males was approximately what percent greater than that for females?

(A) 10% (B) 20% (C) 25%
(D) 35% (E) 75%

24. For state and local government employees, approximately what was the difference between the number of females employed as professionals and the number of females employed in service/maintenance occupations?

(A) 75,000
(B) 185,000
(C) 765,000
(D) 1,070,000
(E) 1,840,000

25. Which of the following statements about state and local government employees can be inferred from the data?

I. Fewer than $\frac{1}{3}$ of those in paraprofessional occupations were males.
II. There were more than 5 times the number of females in the technical occupations as in the skilled craft occupations.
III. There were more than 6 times the number of females in the professional occupations as in the official/administrative occupations.

(A) I only
(B) II only
(C) I and II only
(D) II and III only
(E) I, II, and III

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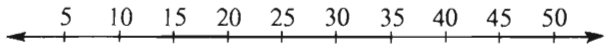
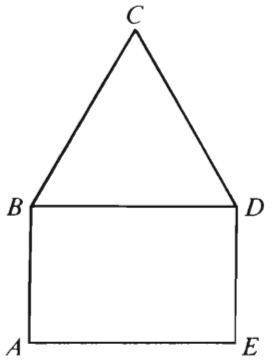


26. On the number line above, what number corresponds to a point that is $\frac{2}{5}$ of the distance from 10 to 40?

(A) 6 (B) 8 (C) 12 (D) 15 (E) 22



27. If polygon $ABCDE$ above has perimeter 26 and equilateral triangle BCD has perimeter 18, what is the area of rectangular region $ABDE$?

(A) 6
(B) 12
(C) 24
(D) 32
(E) 48

28. Which of the following expressions has (have) the same value for $n = 5$ as for $n = \frac{1}{5}$?

I. $n + \frac{1}{n}$

II. $n - \frac{1}{n}$

III. $\dfrac{n}{\frac{1}{n}}$

(A) I only (B) II only (C) III only
(D) I and II (E) II and III

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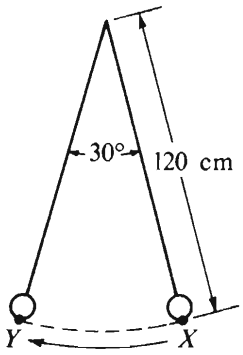

29. The figure above shows the path traced by the end of a pendulum as it moves from point X to point Y. How many centimeters does the end of the pendulum travel along the arc from X to Y?

(A) 4π
(B) 5π
(C) 10π
(D) 20π
(E) 36π

30. If $p = \frac{2}{3}$ and $r = 4$, then $(p\sqrt{3})^r - \left(p + \frac{1}{9}\right) =$

(A) -1 (B) $-\frac{5}{9}$ (C) $\frac{5}{9}$ (D) 1 (E) $\frac{11}{9}$

SECTION 3

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-6

Nine people—F, G, H, I, J, K, L, M, and N—are the only people who can serve on three committees designated X, Y, and Z, and each person must serve on exactly one of the committees.

Committee X must have exactly one more member than does committee Y.

It is possible that there are no members of committee Z.

Neither F nor G nor H can serve on committee X.

Neither I nor J nor K can serve on committee Y.

Neither L nor M nor N can serve on committee Z.

1. If L and F are the only persons serving on committee Y, how many of the nine people must serve on committee Z?

(A) 3
(B) 4
(C) 5
(D) 6
(E) 7

2. Of the nine people, the greatest number that can serve together on committee Z is

(A) 9
(B) 8
(C) 7
(D) 6
(E) 5

3. If N is the only person serving on committee Y, which of the following must serve on committee X?

(A) I and M
(B) J and K
(C) J and L
(D) K and M
(E) L and M

4. If none of the nine people serves on committee Z, which of the following must be a person who serves on committee X?

(A) F
(B) G
(C) I
(D) L
(E) M

5. If L, M, and H are the only persons serving on committee Y, the complete membership of committee Z must be

(A) F and G
(B) F and I
(C) G and J
(D) G and K
(E) H and J

6. Which of the following groups could constitute the membership of committee Z?

(A) G and L
(B) H and K
(C) G, H, and I
(D) I, J, and K
(E) F, H, K, and N

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7. Because they were anxious to balance Wyoming's population of 8,000 men and 2,000 women, the state's lawmakers extended voting rights to women in Wyoming in 1869.

   Which of the following can serve as an assumption on which the lawmakers' decision was directly based?

   (A) Women would vote in ways that would make Wyoming a better place to live.
   (B) Women were superior to men in the ability to make political decisions.
   (C) Women would want to live in a place where they could vote.
   (D) Women who were willing to endure frontier conditions deserved the right to vote.
   (E) Women who voted would be better citizens than those who did not.

8. Researchers have discovered a new poison, bromethalin, that is lethal to all rats, even to those species that have become immune to other poisons, as well as to those rats that eat only the most minute quantities. Tests have demonstrated that rats will not learn to avoid bromethalin and that carcasses of rats killed by bromethalin pose no threat to the well-being of other animals.

   Which of the following statements, if true, would support the researchers' claim that carcasses of rats killed by bromethalin will not pose a threat to other animals ?

   (A) Rats that consume bromethalin die immediately.
   (B) Animals, prompted by curiosity, often examine carcasses that appear in their territory.
   (C) Chemicals in the digestive tract of dead rats quickly break bromethalin down into a nontoxic substance.
   (D) Traces of bromethalin remain in the rat's mouth and saliva after the rat eats the poison.
   (E) Certain animals are scavengers and feed habitually on refuse and dead flesh.

9. If carbon dioxide gas is generated in large enough quantities, it will collect in the atmosphere and cause an unwelcome warming effect on climate.

   The decay of plants, including trees, generates carbon dioxide, but in forests such carbon dioxide is balanced by the carbon dioxide taken in by living plants, which give off oxygen.

   The use in industry of fuels derived from plants generates a large amount of carbon dioxide; such fuels include wood, coal, and oil.

   If the statements above are true, which of the following can properly be concluded from them?

   (A) All of the carbon dioxide that can be generated in an industrial society is attributable to plants, directly or indirectly.
   (B) An unwelcome warming effect on climate cannot be avoided, since carbon dioxide is given off by the natural processes of decay in plants.
   (C) Forests contribute as much carbon dioxide to the atmosphere as does the industrial use of fuel derived from plants.
   (D) A society that uses plant-based fuels in industry will contribute a net surplus of carbon dioxide to the atmosphere, unless the gas is reabsorbed in some way.
   (E) No matter which fuels are used by industry, there is bound to be an increase in the total amount of carbon dioxide in the atmosphere and a consequent unwelcome warming effect on climate.

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Questions 10-15

H, J, K, L, M, N, and O are the only legislators eligible to vote on Bills 1, 2, and 3, each of which will be passed if at least four legislators vote in favor of it. Each legislator must vote on all three bills; no abstentions are possible. The following is known:

H must vote against all three bills; each of the other legislators must vote in favor of at least one bill and against at least one bill.
J must vote against Bill 1.
O must vote against Bills 2 and 3.
L must vote the same way that K does on all three bills.
N must vote the same way that O does on all three bills.

10. Which of the following must vote in favor of Bill 1 ?

(A) J (B) K (C) L (D) M (E) O

11. The maximum number of favorable votes that Bill 2 could receive is

(A) two
(B) three
(C) four
(D) five
(E) six

12. Which of the following CANNOT be true?

(A) J and K vote in favor of the same bill.
(B) J and O vote in favor of the same bill.
(C) J votes in favor of one bill and against two bills.
(D) K votes in favor of two bills and against one bill.
(E) N votes in favor of one bill and against two bills.

13. If any bill is to be passed, which of the following must be among the legislators who vote in favor of it?

(A) J (B) K (C) M (D) N (E) O

14. If M votes the same way that O does on all three bills, which of the following can be determined?

(A) Bill 1 will be passed.
(B) Bill 1 will be defeated.
(C) Bill 2 will be passed.
(D) Bill 2 will be defeated.
(E) Bill 3 will be passed.

15. If K votes in favor of Bills 2 and 3, which of the following can be determined?

(A) Bill 1 will be passed.
(B) Bill 1 will be defeated.
(C) Bill 2 will be passed.
(D) Bill 2 will be defeated.
(E) Bill 3 will be passed.

GO ON TO THE NEXT PAGE.

Questions 16-18

The five staff members of the customer service department of a retail store—Paul, Quentin, Rachel, Stella, and Ted—are passing around a single copy of a letter of complaint because no one wants to take responsibility for answering it or for discarding it. When a staff member receives the letter, he or she sends it on the morning of the next workday (Monday through Friday) to another staff member, who receives it on the same day that it is sent.

Paul always sends the letter to Ted.
Ted always sends the letter to Stella.
Stella sends the letter to no one but Quentin or Rachel.
Quentin sends the letter to no one but Paul or Rachel.
Rachel sends the letter to no one but Paul or Ted.

16. If Rachel receives the letter on a Monday, which of the following staff members are certain to receive it before Friday?

(A) Both Paul and Quentin
(B) Both Paul and Stella
(C) Both Paul and Ted
(D) Both Quentin and Stella
(E) Both Stella and Ted

17. Which of the following lists all those staff members, and only those staff members, who are included in the shortest possible repeating sequence of letter senders?

(A) Rachel, Stella, Ted
(B) Quentin, Rachel, Stella
(C) Stella, Ted
(D) Quentin, Ted
(E) Rachel

18. If the letter comes to Rachel a second time and she sends it on, which of the following is the complete and accurate list of Rachel's fellow staff members who might never subsequently receive the letter?

(A) Paul
(B) Quentin
(C) Stella
(D) Paul, Quentin
(E) Paul, Stella

GO ON TO THE NEXT PAGE.

Questions 19-22

Each of exactly six objects—S, T, U, V, W, and X—is to be placed in one of six slots numbered consecutively one through six. Each slot must have one of the objects placed in it. The arrangement of these objects in the six slots is subject to the following conditions:

If S is to be in a lower-numbered slot than U, then T must be in a lower-numbered slot than W.
If T is to be in a lower-numbered slot than V, then W must be in a lower-numbered slot than X.
If X is to be in a lower-numbered slot than S, then U must be in a lower-numbered slot than V.

19. Which of the following arrangements of the objects in slots one through six, beginning with slot one, conforms to the conditions?

(A) S, U, T, W, V, X
(B) S, X, W, U, T, V
(C) V, U, T, X, W, S
(D) W, S, T, V, X, U
(E) X, V, S, U, W, T

20. If the six objects have erroneously been placed in slots one through six in the order W, X, S, U, T, V, and if the error is to be rectified by reversing the placement of exactly two objects in two immediately adjacent slots, those objects are the ones in slots

(A) one and two
(B) two and three
(C) three and four
(D) four and five
(E) five and six

21. If X, S, and U are to be in the first, the second, and the third slot, respectively, the other three objects must be in which of the following orders, beginning with slot four?

(A) T, V, W
(B) T, W, V
(C) V, T, W
(D) V, W, T
(E) W, V, T

22. If V is to be in the first slot, each of the following could be in the sixth slot EXCEPT

(A) S
(B) T
(C) U
(D) W
(E) X

GO ON TO THE NEXT PAGE.

23. The ratio of divorces to marriages has increased since 1940. Therefore, there must be a greater proportion of children living with only one natural parent than there was in 1940.

Which of the following, if true, most strongly weakens the inference drawn above?

(A) The number of marriages entered into by women twenty-five to thirty-five years old has decreased since 1940.
(B) When there is a divorce, children are often given the option of deciding which parent they will live with.
(C) Since 1940 the average number of children in a family has remained approximately steady and has not been subject to wide fluctuations.
(D) Before 1940 relatively few children whose parents had both died were adopted into single-parent families.
(E) The proportion of children who must be raised by one parent because the other has died has decreased since 1940 as a result of medical advances.

24. Since the Airline Deregulation Act of 1978, major airline companies in the United States have cut their employee ranks by more than 3,000 persons. Thus, although deregulated competition has afforded consumers dramatically lower fares, the economy of the United States has been harmed by deregulation of the airlines.

The argument above would be most seriously weakened if it were true that

(A) a poll of people in the United States expressed exceptionally strong support for airline deregulation
(B) fewer passengers now travel on commercial airlines than traveled on them in 1978, with the consequence that fewer employees are needed to operate the airlines than were needed in 1978
(C) airlines now fly a more restricted regular schedule of routes than they did in 1978, with the consequence that the industry is more highly concentrated and competitive than it was before 1978
(D) several major airlines now enjoy significantly higher profits and levels of employment than they did in the years preceding the Deregulation Act
(E) smaller carriers of passengers have thrived as a result of deregulation and now provide more new jobs than the major airlines have eliminated since 1978

25. Last year, support for the social and behavioral sciences represented only about three percent of the government's total budget for research funds in the United States. Thus, the particularly sharp reductions imposed on such programs this year seem dictated not by financial constraints but by social philosophy.

Which of the following is an assumption on which the conclusion of the passage above is based?

(A) The government funds allocated for research in the social and behavioral sciences are not sufficient for the work that needs to be done.
(B) The social and behavioral sciences are as valuable as the physical and biological sciences.
(C) The current reductions will stop research in the social and behavioral sciences.
(D) Government funding is the primary source of research money in the United States.
(E) Three percent is an insignificant portion of the government's total budget for research funds.

SECTION 4

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. As late as 1891 a speaker assured his audience that since profitable farming was the result of natural ability rather than ——, an education in agriculture was ——.

   (A) instruction..vital
   (B) effort..difficult
   (C) learning..useless
   (D) science..intellectual
   (E) luck..senseless

2. In spite of the —— nature of Scotland's terrain, its main roads are surprisingly free from severe ——.

   (A) rocky..weather
   (B) mountainous..grades
   (C) uncharted..flooding
   (D) unpredictable..damage
   (E) landlocked..slipperiness

3. Walpole's art collection was huge and fascinating, and his novel *The Castle of Otranto* was never out of print; none of this mattered to the Victorians, who —— him as, at best, ——.

   (A) dismissed..insignificant
   (B) judged..worthwhile
   (C) revered..talented
   (D) reviled..meager
   (E) taunted..dangerous

4. Since the author frequently —— other scholars, his objection to disputes is not only irrelevant but also ——.

   (A) supports..overbearing
   (B) provokes..frightening
   (C) quotes..curious
   (D) ignores..peevish
   (E) attacks..surprising

5. Longdale and Stern discovered that mitochondria and chloroplasts —— a long, identifiable sequence of DNA; such a coincidence could be ——— only by the transfer of DNA between the two systems.

   (A) manufacture..accomplished
   (B) reveal..repeated
   (C) exhibit..determined
   (D) share..explained
   (E) maintain..contradicted

6. Until the current warming trend exceeds the range of normal climatic fluctuations, there will be, among scientists, considerable ——— the possibility that increasing levels of atmospheric CO_2 can cause long-term warming effects.

   (A) interest in
   (B) uncertainty about
   (C) enthusiasm for
   (D) worry about
   (E) experimentation on

7. Without seeming unworldly, William James appeared wholly removed from the ——— of society, the conventionality of academe.

   (A) ethos
   (B) idealism
   (C) romance
   (D) paradoxes
   (E) commonplaces

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. OATH:PROMISE :: (A) contract:agreement (B) deed:attorney (C) title:estate (D) job:loyalty (E) truce:warfare

9. NEEDLE:KNIT :: (A) loom:weave (B) soap:wash (C) bed:sleep (D) bait:fish (E) match:fire

10. MAIL:MAILBOX :: (A) medicine:treatment (B) laundry:hamper (C) gasoline:pump (D) coat:factory (E) toothpaste:cleanliness

11. ASTRINGENT:PUCKER :: (A) speed:collision (B) consolation:sorrow (C) proposition:solution (D) spark:ignition (E) texture:surface

12. HEMORRHAGE:BLEEDING :: (A) vertigo:dizziness (B) asthma:respiration (C) obesity:food (D) anemia:vitality (E) tension:pain

13. INDULGE:ASCETIC :: (A) adapt:mutineer (B) sacrifice:politician (C) restrain:libertine (D) defy:traitor (E) stint:benefactor

14. LURK:WAIT :: (A) abscond:depart (B) bilk:cheat (C) topple:stabilize (D) deplete:drain (E) boost:elevate

15. INTERESTED:AGOG :: (A) persistent:daunted (B) careful:meticulous (C) curious:questioning (D) blithe:willful (E) occupied:engaged

16. DOGMA:ICONOCLAST :: (A) authority:subordinate (B) patriotism:coward (C) ideology:rebel (D) responsibility:renegade (E) convention:maverick

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Hydrogeology is a science dealing with the properties, distribution, and circulation of water on the surface of the land, in the soil and underlying rocks, and in the atmosphere. The hydrologic cycle, a major topic in this science, is the complete cycle of phenomena through which water passes, beginning as atmospheric water vapor, passing into liquid and solid form as precipitation, thence along and into the ground surface, and finally again returning to the form of atmospheric water vapor by means of evaporation and transpiration.

The term "geohydrology" is sometimes erroneously used as a synonym for "hydrogeology." Geohydrology is concerned with underground water. There are many formations that contain water but are not part of the hydrologic cycle because of geologic changes that have isolated them underground. These systems are properly termed geohydrologic but not hydrogeologic. Only when a system possesses natural or artificial boundaries that associate the water within it with the hydrologic cycle may the entire system properly be termed hydrogeologic.

17. The author's primary purpose is most probably to
    (A) present a hypothesis
    (B) refute an argument
    (C) correct a misconception
    (D) predict an occurrence
    (E) describe an enigma

18. It can be inferred that which of the following is most likely to be the subject of study by a geohydrologist?
    (A) Soft, porous rock being worn away by a waterfall
    (B) Water depositing minerals on the banks of a gorge through which the water runs
    (C) The trapping of water in a sealed underground rock cavern through the action of an earthquake
    (D) Water becoming unfit to drink through the release of pollutants into it from a manufacturing plant
    (E) The changing course of a river channel as the action of the water wears away the rocks past which the river flows

19. The author refers to "many formations" (line 16) primarily in order to
    (A) clarify a distinction
    (B) introduce a subject
    (C) draw an analogy
    (D) emphasize a similarity
    (E) resolve a conflict

GO ON TO THE NEXT PAGE.

The historian Frederick J. Turner wrote in the 1890's that the agrarian discontent that had been developing steadily in the United States since about 1870 had been precipitated by the closing of the internal frontier—that is, the depletion of available new land needed for further expansion of the American farming system. Not only was Turner's thesis influential at the time, it was later adopted and elaborated by other scholars, such as John D. Hicks in *The Populist Revolt* (1931). Actually, however, new lands were taken up for farming in the United States throughout and beyond the nineteenth century. In the 1890's, when agrarian discontent had become most acute, 1,100,000 new farms were settled, which was 500,000 more than had been settled during the previous decade. After 1890, under the terms of the Homestead Act and its successors, more new land was taken up for farming than had been taken up for this purpose in the United States up until that time. It is true that a high proportion of the newly farmed land was suitable only for grazing and dry farming, but agricultural practices had become sufficiently advanced to make it possible to increase the profitability of farming by utilizing even these relatively barren lands.

The emphasis given by both scholars and statesmen to the presumed disappearance of the American frontier helped to obscure the great importance of changes in the conditions and consequences of international trade that occurred during the second half of the nineteenth century. In 1869 the Suez Canal was opened and the first transcontinental railroad in the United States was completed. An extensive network of telegraph and telephone communications was spun: Europe was connected by submarine cable with the United States in 1866 and with South America in 1874. By about 1870 improvements in agricultural technology made possible the full exploitation of areas that were most suitable for extensive farming on a mechanized basis. Huge tracts of land were being settled and farmed in Argentina, Australia, Canada, and in the American West, and these areas were joined with one another and with the countries of Europe into an interdependent market system. As a consequence, agrarian depressions no longer were local or national in scope, and they struck several nations whose internal frontiers had not vanished or were not about to vanish. Between the early 1870's and the 1890's, the mounting agrarian discontent in America paralleled the almost uninterrupted decline in the prices of American agricultural products on foreign markets. Those staple-growing farmers in the United States who exhibited the greatest discontent were those who had become most dependent on foreign markets for the sale of their products. Insofar as Americans had been deterred from taking up new land for farming, it was because market conditions had made this period a perilous time in which to do so.

20. The author is primarily concerned with
    (A) showing that a certain interpretation is better supported by the evidence than is an alternative explanation
    (B) developing an alternative interpretation by using sources of evidence that formerly had been unavailable
    (C) questioning the accuracy of the evidence that most scholars have used to counter the author's own interpretation
    (D) reviewing the evidence that formerly had been thought to obscure a valid interpretation
    (E) presenting evidence in support of a controversial version of an earlier interpretation

21. According to the author, changes in the conditions of international trade resulted in an
    (A) underestimation of the amount of new land that was being farmed in the United States
    (B) underutilization of relatively small but rich plots of land
    (C) overexpansion of the world transportation network for shipping agricultural products
    (D) extension of agrarian depressions beyond national boundaries
    (E) emphasis on the importance of market forces in determining the prices of agricultural products

GO ON TO THE NEXT PAGE.

22. The author implies that the change in the state of the American farmer's morale during the latter part of the nineteenth century was traceable to the American farmer's increasing perception that the

(A) costs of cultivating the land were prohibitive within the United States
(B) development of the first transcontinental railroad in the United States occurred at the expense of the American farmer
(C) American farming system was about to run out of the new farmland that was required for its expansion
(D) prices of American agricultural products were deteriorating especially rapidly on domestic markets
(E) proceeds from the sales of American agricultural products on foreign markets were unsatisfactory

23. According to the passage, which of the following occurred prior to 1890 ?

(A) Frederick J. Turner's thesis regarding the American frontier became influential.
(B) The Homestead Act led to an increase in the amount of newly farmed land in the United States.
(C) The manufacturers of technologically advanced agricultural machinery rapidly increased their marketing efforts.
(D) Direct lines of communication were constructed between the United States and South America.
(E) Technological advances made it fruitful to farm extensively on a mechanized basis.

24. The author implies that, after certain territories and countries had been joined into an interdependent market system in the nineteenth century, agrarian depressions within that system

(A) spread to several nations, excluding those in which the internal frontier remained open
(B) manifested themselves in several nations, including those in which new land remained available for farming
(C) slowed down the pace of new technological developments in international communications and transportation
(D) affected the local and national prices of the nonagricultural products of several nations
(E) encouraged several nations to sell more of their agricultural products on foreign markets

25. The author provides information concerning newly farmed lands in the United States (lines 11-27) as evidence in direct support of which of the following?

(A) A proposal by Frederick J. Turner that was later disputed by John D. Hicks
(B) An elaboration by John D. Hicks of a thesis that formerly had been questioned by Frederick J. Turner
(C) The established view that was disputed by those scholars who adopted the thesis of Frederick J. Turner
(D) The thesis that important changes occurred in the nature of international trade during the second half of the nineteenth century
(E) The view that the American frontier did not become closed during the nineteenth century or soon thereafter

26. The author implies that the cause of the agrarian discontent was

(A) masked by the vagueness of the official records on newly settled farms
(B) overshadowed by disputes on the reliability of the existing historical evidence
(C) misidentified as a result of influential but erroneous theorizing
(D) overlooked because of a preoccupation with market conditions
(E) undetected because visible indications of the cause occurred so gradually and sporadically

27. The author's argument implies that, compared to the yearly price changes that actually occurred on foreign agricultural markets during the 1880's, American farmers would have most preferred yearly price changes that were

(A) much smaller and in the same direction
(B) much smaller but in the opposite direction
(C) slightly smaller and in the same direction
(D) similar in size but in the opposite direction
(E) slightly greater and in the same direction

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. CONTAMINATE: (A) distill (B) embellish (C) purify (D) ameliorate (E) rehabilitate

29. FOCUS: (A) equate (B) diffuse (C) permit (D) dissect (E) abstract

30. UNDERMINE: (A) originate (B) plan (C) smooth (D) reinforce (E) resume

31. FLUKE:
(A) reexamined opinion
(B) expected occurrence
(C) observed experiment
(D) burst of insight
(E) lack of judgment

32. PREEN: (A) envelop (B) offend (C) confine (D) antagonize (E) rumple

33. DIN: (A) resonance (B) weakness (C) hush (D) uninhabitable place (E) unobstructed view

34. QUIESCENCE: (A) strong conviction (B) restless activity (C) rapid decline (D) ambivalence (E) discourtesy

35. OBDURATE: (A) fluent (B) demonstrative (C) duplicitous (D) complaisant (E) ineffectual

36. SALUBRIOUS:
(A) unhealthy (B) unpalatable (C) insipid (D) steadily weakening (E) awkwardly located

37. BALEFUL: (A) beneficent (B) undemanding (C) eloquent (D) enticing (E) extroverted

38. VERDANT: (A) tranquil (B) ominous (C) lucid (D) tepid (E) sere

SECTION 5

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

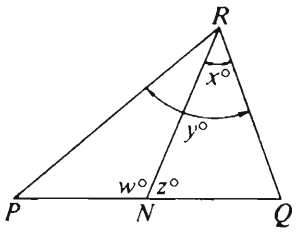
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	$r = 5$ $s = 2$	
1.	$r - 2s + 2$	$\frac{rs}{6}$

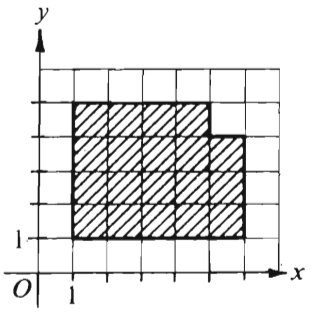


Figure I

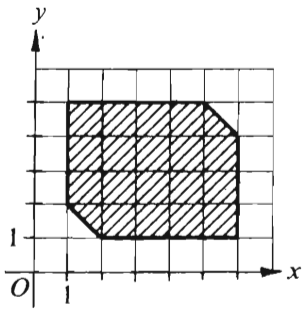


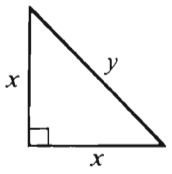
Figure II

2.	The area of the shaded region shown in Figure I	The area of the shaded region shown in Figure II

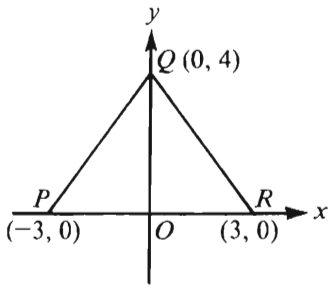
Lila purchased a hat and a scarf for a total of \$40. She received a 25 percent discount on the price of the scarf and a 15 percent discount on the price of the hat.

3.	The amount Lila saved on the scarf	The amount Lila saved on the hat
4.	(25% of 12) + 8	25% of (12 + 8)

	Column A	Column B



5.	x^2	y^2
	$x \neq 0$	
6.	x	$\frac{1}{x}$



7.	The perimeter of triangle PQR	18

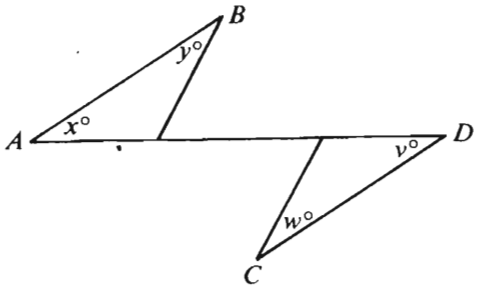
x is a positive integer.

8.	$(-1)^{2x}$	$(-1)^{2x+1}$
9.	The greatest integer x such that $7x < 49$	The least integer y such that $6y > 30$

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
10.	The average (arithmetic mean) of $x+5$, $2x+3$, and $1-3x$	The average (arithmetic mean) of 5, 2, 8, 6, and 4



AB is parallel to CD.

11.	$x+y$	$w+v$
12.	$\sqrt{2}+\sqrt{10}$	$\sqrt{6}+\sqrt{6}$

	Column A	Column B
	A rectangular floor with an area of 12 square meters is drawn to scale with 2 centimeters representing 1 meter.	
13.	The area of the scale drawing of the floor	24 square centimeters
	A deck of n cards contains exactly k marked cards. ($k \neq 0$)	
14.	The ratio of the number of unmarked cards in the deck to the number of marked cards in the deck	$\frac{n}{k}-1$
15.	$2^5 \cdot 5^6$	$5(10^5)$

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

---

16. If $3x + 5 = 2x + 10$, then $x =$

    (A) 1 (B) 2 (C) 3 (D) 5 (E) 15

17. $\frac{1}{3} + \frac{1}{3}$ equals how many twelfths?

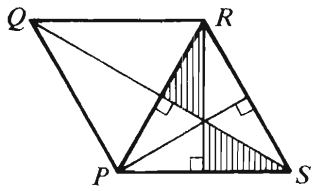
    (A) 2 (B) 4 (C) 6 (D) 8 (E) 9

18. Of the 400 cadets in a graduating class, 30 percent were women and, of these, $\frac{1}{5}$ became instructors. If the number of men who became instructors was twice the number of women who became instructors, how many of the men became instructors?

    (A) 120
    (B) 48
    (C) 40
    (D) 24
    (E) 20

19. Of the following fractions, which has the least value?

    (A) $\frac{8}{7}$ (B) $\frac{8}{9}$ (C) $\frac{5}{6}$ (D) $\frac{7}{8}$ (E) $\frac{7}{9}$



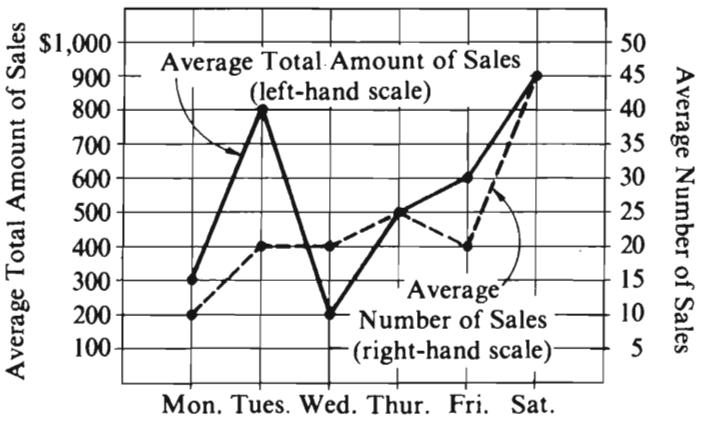
20. If $\triangle PQR$ and $\triangle PRS$ above are equilateral, what fraction of $PQRS$ is shaded?

    (A) $\frac{1}{3}$ (B) $\frac{1}{4}$ (C) $\frac{1}{6}$ (D) $\frac{1}{9}$ (E) $\frac{1}{12}$

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graph.

AVERAGE* DAILY TOTAL AMOUNT OF SALES AND NUMBER OF SALES FOR STORE *X*



*"Average" means "arithmetic mean."

Note: Drawn to scale.

21. What is the average total amount of sales made on a Friday for Store *X*?

(A) $200 (B) $300 (C) $400
(D) $500 (E) $600

22. On the average, what is the total amount of sales per week (Monday through Saturday) for Store *X*?

(A) $2,700 (B) $2,800 (C) $3,300
(D) $3,600 (E) $4,400

23. What is the average amount of a sale made on a Wednesday for Store *X*?

(A) $0.50 (B) $2.00 (C) $10.00
(D) $20.00 (E) $40.00

24. On which of the following days is the average amount of a sale greatest for Store *X*?

(A) Monday
(B) Tuesday
(C) Wednesday
(D) Thursday
(E) Saturday

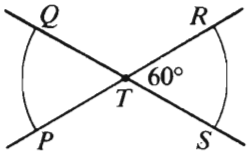
25. During the first week of a certain month, how many more sales were made in Store *X* on Saturday than on Monday?

(A) 15 (B) 25 (C) 30 (D) 35
(E) It cannot be determined from the information given.

GO ON TO THE NEXT PAGE.

26. A train travels from City X to City Y in 3 hours and 30 minutes at an average speed of 60 miles per hour. If the train returns at an average speed of 50 miles per hour, how long does the return trip take?

(A) 2 hr 55 min
(B) 3 hr 40 min
(C) 4 hr 12 min
(D) 4 hr 32 min
(E) 4 hr 40 min



27. In the figure above, if point T is 6 centimeters from every point on arc PQ and from every point on arc RS, what is the sum of the areas, in square centimeters, of regions PQT and TRS?

(A) 6
(B) 4π
(C) 6π
(D) 24
(E) 12π

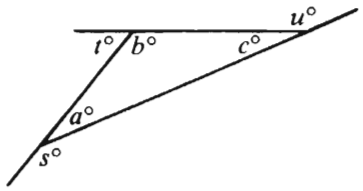
$4 - n \square 6$
$4 - n \square 5$

28. Which of the following symbols should be substituted for $\square$ to make both of the statements above true for all integers n such that $-2 < n \leq 3$?

(A) $\leq$ (B) $<$ (C) $=$ (D) $>$ (E) $\geq$

29. $\left(\frac{8\sqrt{2}-4}{4}\right)^2 =$

(A) $9 - 4\sqrt{2}$
(B) $36 - 16\sqrt{2}$
(C) 8
(D) 9
(E) $32\sqrt{2}$



30. In the figure above, $\frac{a+b+c}{s+t+u} =$

(A) $\frac{1}{3}$ (B) $\frac{1}{2}$ (C) $\frac{2}{3}$ (D) 1 (E) $\frac{3}{2}$

SECTION 6
Time—30 minutes
25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-3

A loop bus has exactly six stops on its route. The bus first stops at stop one and then at stops two, three, four, five, and six in that order. After leaving stop six, the bus returns to stop one and continues around the loop again. The stops are at six buildings that are, in alphabetical order, Garfield, Harrison, Johnson, Kennedy, Lincoln, and Madison.

Lincoln is stop three.
Harrison is stop six.
Kennedy is the stop immediately before Madison.
Johnson is the stop immediately before Garfield.

1. If Johnson is stop four, which of the following must be the stop immediately before Lincoln?
   (A) Kennedy
   (B) Madison
   (C) Johnson
   (D) Garfield
   (E) Harrison

2. If Garfield is stop two, which of the following must be the stop immediately before Harrison?
   (A) Johnson
   (B) Garfield
   (C) Lincoln
   (D) Kennedy
   (E) Madison

3. If a passenger gets on the bus at Kennedy, rides past one of the stops, and gets off at Lincoln, which of the following must be true?
   (A) Kennedy is stop one.
   (B) Madison is stop three.
   (C) Lincoln is stop four.
   (D) Johnson is stop five.
   (E) Garfield is stop six.

4. According to a recent survey, marriage is fattening. Cited as evidence is the survey's finding that the average woman gains 23 pounds and the average man gains 18 pounds during 13 years of marriage.

   The answer to which of the following questions would be most relevant in evaluating the reasoning presented in the survey?
   (A) Why was the period of time studied in the survey 13 years, rather than 12 or 14 ?
   (B) Did some of the men surveyed gain less than 18 pounds during the time they were married?
   (C) How much weight is gained or lost in 13 years by single people of comparable age to those surveyed?
   (D) Were the women surveyed as active as the men surveyed, at the time the survey was made?
   (E) Will the reported gains be maintained over the lifetimes of the persons surveyed?

GO ON TO THE NEXT PAGE.

5. Speakers of a language rely on their general knowledge of the world in order to make sense of statements they hear or read. Computers can easily be "taught" the formal rules of a human language, but supplying them with this general knowledge is another matter. It is extremely difficult to develop computers that can extract the meaning of ordinary sentences.

   Which of the following can be validly inferred from the passage above?

   (A) The interpretation of the meaning of ordinary sentences is dependent on a general knowledge of the world.
   (B) Computers that can be "taught" the rules of a human language can understand statements in that language.
   (C) It is futile to try to "teach" computers the formal rules of any language.
   (D) Speakers of a language often must reject the formal rules of that language in order to understand simple sentences.
   (E) Computers that can understand ordinary sentences have all the basic capabilities necessary to become "speakers" of the language.

6. In mammals it is the secondary palate that permits breathing while eating. Clearly, breathing while eating is necessary to maintain the high rate of metabolism of mammals.

   The author's assertions would be most weakened by the discovery of a mammalian species that had a

   (A) high rate of metabolism and the ability to breathe while eating
   (B) low rate of metabolism and the ability to breathe while eating
   (C) low rate of metabolism and no ability to breathe while eating
   (D) high rate of metabolism and no secondary palate
   (E) low rate of metabolism and a secondary palate

Questions 7-9

The cast of a benefit program will consist of exactly four actors to be selected from the seven actors P, Q, R, S, T, U, and V according to the following conditions:

Either P or T must be in the cast, but they cannot both be in the cast.
If T is in the cast, then Q must be in the cast.
If U is in the cast, then neither P nor R can be in the cast.

7. If U is in the cast, which of the following must also be in the cast?

   (A) P (B) Q (C) R (D) S (E) V

8. If P is in the cast, any of the following groups of three could make up the rest of the cast EXCEPT

   (A) Q, R, and S
   (B) Q, R, and V
   (C) Q, S, and V
   (D) R, S, and V
   (E) S, U, and V

9. If S is in the cast but needs to be replaced, which of the following actors, if not in the cast, is eligible to replace S regardless of the composition of the rest of the cast?

   (A) P (B) R (C) T (D) U (E) V

GO ON TO THE NEXT PAGE.

Questions 10-16

The only persons who attended a meeting were four ship captains and the first mates of three of those captains. The captains were R, S, T, and W; the first mates were L, N, and V. Each person in turn delivered a report to the group as follows:

Each first mate present spoke immediately after his or her captain.

S was the first captain to speak, and T was the second captain to speak.

10. All of the following are possible orders of speakers EXCEPT

(A) S, L, T, V, W, R, N
(B) S, N, T, V, R, W, L
(C) S, T, L, R, N, W, V
(D) S, T, L, W, N, R, V
(E) S, T, V, N, W, R, L

11. If R spoke after L, and L was the third of the first mates to speak, all of the following statements could be true EXCEPT:

(A) W spoke immediately after V.
(B) The order of the first four speakers was S, V, T, N.
(C) W's first mate was present.
(D) L was the fourth speaker after S.
(E) The captains spoke in the order S, T, W, R.

12. Which of the following must be true?

(A) If the second speaker was a captain, the seventh speaker was a first mate.
(B) If the second speaker was a first mate, the seventh speaker was a captain.
(C) If the third speaker was a first mate, the seventh speaker was a captain.
(D) If the third speaker was a captain, the seventh speaker was a first mate.
(E) If the seventh speaker was a first mate, the first and third speakers were captains.

13. If L spoke immediately after R and immediately before W, and W was not the last speaker, R spoke

(A) second
(B) third
(C) fourth
(D) fifth
(E) sixth

14. If V is S's first mate, N could be the person who spoke immediately

(A) before T
(B) before L
(C) before V
(D) after T
(E) after V

15. If L was the third of the first mates to speak, and R was the captain whose first mate was not present, which of the following must be true?

(A) L spoke sometime before R.
(B) N spoke sometime before W.
(C) R spoke sometime before W.
(D) W spoke sometime before R.
(E) W spoke sometime before T.

16. Which of the following additional conditions would make S, N, T, V, R, W, L the only possible order of speakers?

(A) N is S's first mate; V is T's first mate; L is W's first mate.
(B) N is S's first mate; V is T's first mate; L was the second to speak after R.
(C) The order of the first four speakers was S, N, T, V.
(D) The order of the last three speakers was R, W, L.
(E) The order in which the captains spoke was S, T, R, W.

GO ON TO THE NEXT PAGE.

Questions 17-19

Exactly 7 persons—I, J, K, L, M, N, and O—participate in games played at a picnic. There is one game each of horseshoes, volleyball, and tag. Horseshoes must be played by either 3 or 4 persons; volleyball must be played by either 4 or 6 persons; and tag can be played by any number so long as there are at least 2. The following restrictions also apply to the games played:

Each person must play exactly two of the three games.
I must play horseshoes.
K must play tag.
N must play volleyball.
M must play in both games in which I plays.
O must play in both games in which L plays.

17. If K plays in the same two games as N, each of the following must be true EXCEPT:

(A) I plays horseshoes.
(B) N plays horseshoes.
(C) K plays tag.
(D) N plays tag.
(E) K plays volleyball.

18. If I and N play tag, and if 4 persons play horseshoes, the persons playing horseshoes, besides I and M, must be which of the following?

(A) J and K
(B) J and N
(C) K and N
(D) K and O
(E) L and N

19. If N is the only person who plays both horseshoes and volleyball, it must be true that

(A) L plays horseshoes
(B) M plays volleyball
(C) K plays volleyball
(D) N plays tag
(E) I plays tag

Questions 20-22

A person who is drawing up a will has exactly five potential heirs—S, T, U, V, and W. The estate will distribute exactly seven lots of land, which are numbered 1 through 7. All seven lots will be distributed, subject to the following restrictions:

No lot is to be shared, and no heir can inherit more than three lots.
Whoever inherits lot 2 cannot inherit any other lot.
No heir can inherit both lot 3 and lot 4.
If S inherits one or more lots, then U cannot inherit any.
If S inherits lot 2, then T must inherit lot 4.
W must inherit lot 6 but cannot inherit lot 3.

20. If S inherits lot 2, who must inherit lot 3 ?

(A) S (B) T (C) U (D) V (E) W

21. If S inherits lot 2 and three heirs inherit two lots each, no one can inherit both lots

(A) 1 and 3
(B) 1 and 6
(C) 1 and 7
(D) 4 and 5
(E) 6 and 7

22. If U and V inherit no lots, which of the following must inherit three lots?

(A) S only
(B) T only
(C) W only
(D) Both S and T
(E) Both S and W

GO ON TO THE NEXT PAGE.

23. Forty-five percent of all blood donated in the United States is type O. Type O blood is essential for emergencies where there is no time for determining the blood type of victims because type O blood can be used for everyone. Type O blood is unique in that it is compatible with blood of all types: any recipient, regardless of blood type, can be given it. But precisely because of this special usefulness, type O blood is chronically in short supply.

If the statements in the passage above are true, which of the following must also be true?

(A) The special usefulness of type O blood lies in the fact that it matches the blood type of most people.
(B) Supplies of type O blood are continuously so low that type O blood is unavailable for emergencies, where its usefulness would be greatest.
(C) Forty-five percent of the total population of the United States has type O blood, which makes type O the most common blood type.
(D) Any decision to give blood of any type other than O needs to be based on knowledge of the recipient's blood type.
(E) Type O blood is the only blood that cannot be typed as fast as needed in emergencies.

* 24. Many geologists theorize that the trail of volcanic craters and cinder cones along the Snake River plain of southern Idaho was produced as the North American continent slid westward over a stationary "plume," a vertical channel through which molten rock rose intermittently from the Earth's core to burst through its crust.

Which of the following, if true, tends to support the geologists' theory of how the trail was produced?

(A) The largest craters and cinder cones are on the eastern margin of the trail.
(B) The most violent volcanic activity apparently occurred at the western margin of the trail.
(C) The craters and cinder cones are evenly spaced throughout the extent of the trail.
(D) The newest craters and cinder cones are on the eastern margin of the trail.
(E) The craters and cinder cones on the western margin of the trail generally took longer to form than did those on the eastern margin.

25. It has been hypothesized that much of the matter in the universe is "dark"; i.e., unseen. Studies have shown that galaxies in many galaxy clusters are moving faster with respect to one another than they would if visible stars constituted all their mass. The studies suggest that the galaxies are moving under the gravitational influence of unseen mass in considerable quantity.

Which of the following is an assumption underlying the passage above?

(A) Measurements of the speed of moving galaxies are extremely unreliable.
(B) The workings of gravitational forces are not particularly well understood.
(C) The aggregate mass of visible stars in the galaxies mentioned above can be estimated with some confidence.
(D) The general composition of unseen matter in the universe has been determined.
(E) Without exception, the galaxies mentioned above move toward one another.

FOR GENERAL TEST 16 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY

Section 1			Section 4		
Number	Answer	P+	Number	Answer	P+
1	A	87	1	C	85
2	D	69	2	B	74
3	E	60	3	A	64
4	E	64	4	E	54
5	B	54	5	D	64
6	D	50	6	B	61
7	C	36	7	E	34
8	B	92	8	A	94
9	A	76	9	A	75
10	B	67	10	B	77
11	E	63	11	D	57
12	C	52	12	A	62
13	D	45	13	C	54
14	B	46	14	A	40
15	B	27	15	B	45
16	B	16	16	E	26
17	E	70	17	C	89
18	D	78	18	C	88
19	C	41	19	A	70
20	A	47	20	A	28
21	D	55	21	D	54
22	B	38	22	E	42
23	C	52	23	E	22
24	E	67	24	B	53
25	C	56	25	E	51
26	E	31	26	C	54
27	D	52	27	D	47
28	B	94	28	C	90
29	E	90	29	B	82
30	A	66	30	D	81
31	B	76	31	B	75
32	C	57	32	E	56
33	A	54	33	C	51
34	B	48	34	B	39
35	D	29	35	D	44
36	A	36	36	A	35
37	A	30	37	A	24
38	D	24	38	E	18

QUANTITATIVE ABILITY

Section 2			Section 5		
Number	Answer	P+	Number	Answer	P+
1	B	90	1	A	85
2	D	86	2	C	93
3	C	93	3	D	85
4	A	86	4	A	86
5	A	76	5	B	81
6	B	84	6	D	66
7	C	76	7	B	74
8	B	65	8	A	62
9	B	36	9	C	64
10	A	63	10	B	57
11	D	49	11	D	47
12	B	52	12	B	46
13	A	61	13	A	41
14	D	43	14	C	35
15	C	38	15	C	27
16	D	93	16	D	94
17	B	88	17	D	85
18	B	83	18	B	85
19	C	71	19	E	70
20	E	65	20	C	68
21	D	75	21	E	76
22	B	69	22	C	75
23	D	35	23	C	43
24	B	27	24	B	49
25	E	8	25	E	61
26	E	56	26	C	73
27	C	53	27	E	51
28	A	37	28	A	45
29	D	35	29	A	38
30	D	32	30	B	37

ANALYTICAL ABILITY

Section 3			Section 6		
Number	Answer	P+	Number	Answer	P+
1	B	60	1	B	83
2	D	77	2	E	79
3	E	66	3	A	89
4	C	81	4	C	82
5	A	80	5	A	67
6	B	49	6	D	60
7	C	81	7	B	78
8	C	79	8	E	59
9	D	66	9	E	80
10	E	68	10	E	59
11	C	62	11	D	49
12	B	70	12	A	52
13	B	47	13	C	50
14	D	55	14	D	68
15	B	56	15	B	36
16	E	30	16	B	41
17	A	36	17	B	63
18	D	26	18	A	36
19	A	43	19	E	22
20	C	43	20	D	54
21	C	41	21	C	31
22	A	19	22	E	11
23	E	25	23	D	38
24	E	33	24	D	24
25	E	27	25	C	41

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 16 ONLY AND THE PERCENTS BELOW*

Raw Score	Scaled Scores and Percents Below*						Raw Score	Scaled Scores and Percents Below*					
	Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below		Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below
73-76	800	99					40	450	43	590	58	730	94
72	790	99					39	440	40	570	53	710	92
71	780	99					38	430	37	560	51	700	91
70	770	99					37	420	34	550	49	680	88
69	750	98					36	410	31	530	43	670	86
68	740	98					35	400	28	520	41	650	83
67	730	97					34	400	28	510	38	630	78
66	720	96					33	390	26	490	34	620	76
65	710	96					32	380	24	480	31	600	71
64	690	94					31	370	22	470	29	590	69
63	680	93					30	360	18	450	25	570	63
62	670	92					29	360	18	440	23	560	60
61	660	91					28	350	16	430	21	540	55
60	650	89	800	98			27	340	14	410	17	530	52
59	640	88	800	98			26	330	12	400	16	510	45
58	630	86	800	98			25	320	10	390	14	500	43
57	610	83	800	98			24	310	9	370	11	480	37
56	600	82	800	98			23	300	7	360	10	470	34
55	590	80	790	97			22	290	6	350	8	450	29
54	580	78	780	96			21	280	5	330	6	440	26
53	570	75	760	93			20	270	4	320	5	420	22
52	560	73	750	91			19	270	4	310	5	410	20
51	550	71	740	90			18	260	3	290	3	390	16
50	540	68	720	86	800	99	17	250	2	280	2	380	14
49	530	65	710	84	800	99	16	240	1	270	2	360	11
48	520	63	690	80	800	99	15	230	1	250	1	340	8
47	510	60	680	78	800	99	14	220	1	240	1	330	7
46	500	57	670	76	800	99	13	210	0	230	1	310	5
45	490	55	650	72	800	99	12	200	0	210	0	300	4
44	480	52	640	70	790	98	11	200	0	200	0	280	3
43	470	49	630	67	770	97	10	200	0	200	0	270	2
42	460	46	610	62	760	97	9	200	0	200	0	250	1
41	460	46	600	61	740	95	8	200	0	200	0	240	1
							7	200	0	200	0	220	1
							6	200	0	200	0	210	0
							0-5	200	0	200	0	200	0

*Percent scoring below the scaled score based on the performance of the 844,960 examinees who took the General Test between October 1, 1984, and September 30, 1987.

TEST 17

SECTION 1

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Created to serve as perfectly as possible their workaday -------, the wooden storage boxes made in America's Shaker communities are now ------- for their beauty.

   (A) environment. .accepted
   (B) owners. .employed
   (C) function. .valued
   (D) reality. .transformed
   (E) image. .seen

2. In order to ------- her theory that the reactions are -------, the scientist conducted many experiments, all of which showed that the heat of the first reaction is more than twice that of the second.

   (A) support. .different
   (B) comprehend. .constant
   (C) evaluate. .concentrated
   (D) capture. .valuable
   (E) demonstrate. .problematic

3. The sheer bulk of data from the mass media seems to overpower us and drive us to ------- accounts for an easily and readily digestible portion of news.

   (A) insular (B) investigative (C) synoptic (D) subjective (E) sensational

4. William James lacked the usual ------- death; writing to his dying father, he spoke without ------- about the old man's impending death.

   (A) longing for. .regret
   (B) awe of. .inhibition
   (C) curiosity about. .rancor
   (D) apprehension of. .eloquence
   (E) anticipation of. .commiseration

5. Current data suggest that, although ------- states between fear and aggression exist, fear and aggression are as distinct physiologically as they are psychologically.

   (A) simultaneous
   (B) serious
   (C) exceptional
   (D) partial
   (E) transitional

6. It is ironic that a critic of such overwhelming vanity now suffers from a measure of the oblivion to which he was forever ------- others; in the end, all his ------- has only worked against him.

   (A) dedicating. .self-possession
   (B) leading. .self-righteousness
   (C) consigning. .self-adulation
   (D) relegating. .self-sacrifice
   (E) condemning. .self-analysis

7. Famous among job seekers for its -------, the company, quite apart from generous salaries, bestowed on its executives annual bonuses and such ------- as low-interest home mortgages and company cars.

   (A) magnanimity. .reparations
   (B) inventiveness. .benefits
   (C) largesse. .perquisites
   (D) discernment. .prerogatives
   (E) altruism. .credits

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. WEB : SPIDER :: (A) flower : bee
(B) canal : otter (C) nest : bird
(D) acorn : squirrel (E) bait : fish

9. FOUR-POSTER : BED ::

(A) convertible : automobile
(B) soldier : army
(C) student : school
(D) chlorine : water
(E) paper : wood

10. BONE : BODY :: (A) scaffold : hinge
(B) brace : corner (C) strut : buttress
(D) lattice : division (E) girder : skyscraper

11. SCOOP : CONCAVE :: (A) tongs : hollow
(B) spatula : flat (C) beater : tined
(D) cleaver : indented (E) skewer : rounded

12. SYMBOLS : REBUS ::

(A) notes : score
(B) military : insignia
(C) proportions : recipe
(D) program : computer
(E) silversmith : hallmark

13. GUSH : EFFUSIVE ::

(A) exult : honest
(B) deliberate : secretive
(C) giggle : innocent
(D) rage : irate
(E) whisper : confidential

14. PERORATION : SPEECH ::
(A) tempo : movement (B) figure : portrait
(C) light : shadow (D) verse : stanza
(E) coda : sonata

15. INTERREGNUM : GOVERNMENT ::
(A) splice : rope (B) cleavage : crystal
(C) infraction : law (D) frequency : wave
(E) hibernation : activity

16. EMBROIDER : CLOTH ::

(A) chase : metal
(B) patch : quilt
(C) gild : gold
(D) carve : knife
(E) stain : glass

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Visual recognition involves storing and retrieving memories. Neural activity, triggered by the eye, forms an image in the brain's memory system that constitutes an internal representation of the viewed object. When an object is encountered again, it is matched with its internal representation and thereby recognized. Controversy surrounds the question of whether recognition is a parallel, one-step process or a serial, step-by-step one. Psychologists of the Gestalt school maintain that objects are recognized as wholes in a parallel procedure: the internal representation is matched with the retinal image in a single operation. Other psychologists have proposed that internal representation features are matched serially with an object's features. Although some experiments show that, as an object becomes familiar, its internal representation becomes more holistic and the recognition process correspondingly more parallel, the weight of evidence seems to support the serial hypothesis, at least for objects that are not notably simple and familiar.

17. The author is primarily concerned with

(A) explaining how the brain receives images
(B) synthesizing hypotheses of visual recognition
(C) examining the evidence supporting the serial-recognition hypothesis
(D) discussing visual recognition and some hypotheses proposed to explain it
(E) reporting on recent experiments dealing with memory systems and their relationship to neural activity

18. According to the passage, Gestalt psychologists make which of the following suppositions about visual recognition?

I. A retinal image is in exactly the same form as its internal representation.
II. An object is recognized as a whole without any need for analysis into component parts.
III. The matching of an object with its internal representation occurs in only one step.

(A) II only
(B) III only
(C) I and III only
(D) II and III only
(E) I, II, and III

19. It can be inferred from the passage that the matching process in visual recognition is

(A) not a neural activity
(B) not possible when an object is viewed for the very first time
(C) not possible if a feature of a familiar object is changed in some way
(D) only possible when a retinal image is received in the brain as a unitary whole
(E) now fully understood as a combination of the serial and parallel processes

20. In terms of its tone and form, the passage can best be characterized as

(A) a biased exposition
(B) a speculative study
(C) a dispassionate presentation
(D) an indignant denial
(E) a dogmatic explanation

GO ON TO THE NEXT PAGE.

In large part as a consequence of the feminist movement, historians have focused a great deal of attention in recent years on determining more accurately the status of women in various periods. Although much has been accomplished for the modern period, premodern cultures have proved more difficult: sources are restricted in number, fragmentary, difficult to interpret, and often contradictory. Thus it is not particularly surprising that some earlier scholarship concerning such cultures has so far gone unchallenged. An example is Johann Bachofen's 1861 treatise on Amazons, women-ruled societies of questionable existence contemporary with ancient Greece.

Starting from the premise that mythology and legend preserve at least a nucleus of historical fact, Bachofen argued that women were dominant in many ancient societies. His work was based on a comprehensive survey of references in the ancient sources to Amazonian and other societies with matrilineal customs—societies in which descent and property rights are traced through the female line. Some support for his theory can be found in evidence such as that drawn from Herodotus, the Greek "historian" of the fifth century B.C., who speaks of an Amazonian society, the Sauromatae, where the women hunted and fought in wars. A woman in this society was not allowed to marry until she had killed a person in battle.

Nonetheless, this assumption that the first recorders of ancient myths have preserved facts is problematic. If one begins by examining why ancients refer to Amazons, it becomes clear that ancient Greek descriptions of such societies were meant not so much to represent observed historical fact—real Amazonian societies—but rather to offer "moral lessons" on the supposed outcome of women's rule in their own society. The Amazons were often characterized, for example, as the equivalents of giants and centaurs, enemies to be slain by Greek heroes. Their customs were presented not as those of a respectable society, but as the very antitheses of ordinary Greek practices.

Thus, I would argue, the purpose of accounts of the Amazons for their male Greek recorders was didactic, to teach both male and female Greeks that all-female groups, formed by withdrawal from traditional society, are destructive and dangerous. Myths about the Amazons were used as arguments for the male-dominated status quo, in which groups composed exclusively of either sex were not permitted to segregate themselves permanently from society. Bachofen was thus misled in his reliance on myths for information about the status of women. The sources that will probably tell contemporary historians most about women in the ancient world are such social documents as gravestones, wills, and marriage contracts. Studies of such documents have already begun to show how mistaken we are when we try to derive our picture of the ancient world exclusively from literary sources, especially myths.

21. The primary purpose of the passage is to

(A) compare competing new approaches to understanding the role of women in ancient societies
(B) investigate the ramifications of Bachofen's theory about the dominance of women in ancient societies
(C) explain the burgeoning interest among historians in determining the actual status of women in various societies
(D) analyze the nature of Amazonian society and uncover similarities between it and the Greek world
(E) criticize the value of ancient myths in determining the status of women in ancient societies

22. All of the following are stated by the author as problems connected with the sources for knowledge of premodern cultures EXCEPT

(A) partial completeness
(B) restricted accessibility
(C) difficulty of interpretation
(D) limited quantity
(E) tendency toward contradiction

23. Which of the following can be inferred from the passage about the myths recorded by the ancient Greeks?

I. They sometimes included portrayals of women holding positions of power.
II. They sometimes contained elaborate explanations of inheritance customs.
III. They comprise almost all of the material available to historians about ancient Greece.

(A) I only (B) III only (C) I and III only
(D) II and III only (E) I, II, and III

GO ON TO THE NEXT PAGE.

24. Which of the following is presented in the passage as evidence supporting the author's view of the ancient Greeks' descriptions of the Amazons?

(A) The requirement that Sauromatae women kill in battle before marrying
(B) The failure of historians to verify that women were ever governors of ancient societies
(C) The classing of Amazons with giants and centaurs
(D) The well-established unreliability of Herodotus as a source of information about ancient societies
(E) The recent discovery of ancient societies with matrilineal customs

25. It can be inferred from the passage that the probable reactions of many males in ancient Greece to the idea of a society ruled by women could best be characterized as

(A) confused and dismayed
(B) wary and hostile
(C) cynical and disinterested
(D) curious but fearful
(E) excited but anxious

26. The author suggests that the main reason for the persisting influence of Bachofen's work is that

(A) feminists have shown little interest in ancient societies
(B) Bachofen's knowledge of Amazonian culture is unparalleled
(C) reliable information about the ancient world is difficult to acquire
(D) ancient societies show the best evidence of women in positions of power
(E) historians have been primarily interested in the modern period

27. The author's attitude toward Bachofen's treatise is best described as one of

(A) qualified approval
(B) profound ambivalence
(C) studied neutrality
(D) pointed disagreement
(E) unmitigated hostility

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. COLLECT : (A) scatter (B) avoid
(C) hide (D) search (E) create

29. SERRATED : (A) without joints
(B) without folds (C) without notches
(D) variegated (E) mutated

30. FLEDGLING :
(A) experienced practitioner
(B) successful competitor
(C) reluctant volunteer
(D) recent convert
(E) attentive listener

31. SUPPOSITION :
(A) certainty
(B) inferiority
(C) irrelevance
(D) unexpected occurrence
(E) clear position

32. ABERRANT : (A) attractive (B) predictive
(C) blissful (D) normal (E) precise

33. OBDURATE : (A) flexible
(B) timid (C) retrospective
(D) whimsical (E) alienated

34. LIST : (A) be upside down
(B) be upright (C) slide backward
(D) sway to and fro (E) lie flat

35. FORESTALL : (A) announce
(B) equivocate (C) prolong
(D) precipitate (E) steady

36. TENDENTIOUS : (A) unbiased
(B) severely hampered (C) inapplicable
(D) highly productive (E) curved

37. REDUNDANT : (A) consistent
(B) complex (C) diffuse
(D) insightful (E) economical

38. RUE : (A) tenderness (B) sincerity
(C) heartiness (D) spite (E) satisfaction

SECTION 2

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. There are no solitary, free-living creatures; every form of life is ------- other forms.

   (A) segregated from (B) parallel to
   (C) dependent on (D) overshadowed by
   (E) mimicked by

2. The sale of Alaska was not so much an American coup as a matter of ------- for an imperial Russia that was short of cash and unable to ------- its own continental coastline.

   (A) negligence. .fortify
   (B) custom. .maintain
   (C) convenience. .stabilize
   (D) expediency. .defend
   (E) exigency. .reinforce

3. Despite assorted effusions to the contrary, there is no necessary link between scientific skill and humanism, and, quite possibly, there may be something of a ------- between them.

   (A) generality (B) fusion (C) congruity
   (D) dichotomy (E) reciprocity

4. A common argument claims that in folk art, the artist's subordination of technical mastery to intense feeling ------- the direct communication of emotion to the viewer.

   (A) facilitates (B) averts (C) neutralizes
   (D) implies (E) represses

5. While not completely nonplussed by the unusually caustic responses from members of the audience, the speaker was nonetheless visibly ------- by their lively criticism.

   (A) humiliated
   (B) discomfited
   (C) deluded
   (D) disgraced
   (E) tantalized

6. In eighth-century Japan, people who ------- wasteland were rewarded with official ranks as part of an effort to overcome the shortage of ------- fields.

   (A) conserved. .forested
   (B) reclaimed. .arable
   (C) cultivated. .domestic
   (D) irrigated. .accessible
   (E) located. .desirable

7. If duty is the natural ------- of one's ------- the course of future events, then people who are powerful have duty placed on them whether they like it or not.

   (A) correlate. .understanding of
   (B) outgrowth. .control over
   (C) determinant. .involvement in
   (D) mitigant. .preoccupation with
   (E) arbiter. .responsibility for

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. COMA : UNCONSCIOUSNESS ::
   (A) amnesia : effort
   (B) delirium : confusion
   (C) paralysis : pain
   (D) hallucination : numbness
   (E) fever : calm

9. TOURNIQUET : BLOOD :: (A) bridge : river
   (B) antiseptic : surgery (C) dam : water
   (D) pressure : air (E) bucket : well

10. FOUNDATION : HOUSE ::
   (A) mountain : tunnel
   (B) ground : sky
   (C) net : trapeze
   (D) pedestal : statue
   (E) pole : banner

11. PHILATELIST : STAMPS ::
   (A) numismatist : coins
   (B) astrologer : predictions
   (C) geneticist : chromosomes
   (D) cartographer : maps
   (E) pawnbroker : jewelry

12. INSECT : BUTTERFLY ::
   (A) perfume : essence
   (B) botany : chrysanthemum
   (C) philosophy : metaphysics
   (D) pitch : black
   (E) color : brightness

13. PERNICIOUS : INJURE ::
   (A) officious : deny
   (B) propitious : conjure
   (C) audacious : allude
   (D) avaricious : dispel
   (E) disingenuous : mislead

14. FLAG : VIGOR :: (A) endure : courage
   (B) tire : monotony (C) question : perception
   (D) waver : resolution (E) flatter : charm

15. EMBARRASS : MORTIFY ::
   (A) adumbrate : insinuate
   (B) indulge : mollycoddle
   (C) aggrandize : venerate
   (D) relent : deflate
   (E) upstage : demoralize

16. DISTILL : PURITY ::
   (A) leaven : volume
   (B) pulverize : fragility
   (C) absorb : brilliance
   (D) homogenize : fluidity
   (E) conduct : charge

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Initially the Vinaver theory that Malory's eight romances, once thought to be fundamentally unified, were in fact eight independent works produced both a sense of relief and an unpleasant shock. Vinaver's theory comfortably explained away the apparent contradictions of chronology and made each romance independently satisfying. It was, however, disagreeable to find that what had been thought of as one book was now eight books. Part of this response was the natural reaction to the disturbance of set ideas. Nevertheless, even now, after lengthy consideration of the theory's refined but legitimate observations, one cannot avoid the conclusion that the eight romances are only one work. It is not quite a matter of disagreeing with the theory of independence, but of rejecting its implications: that the romances may be taken in any or no particular order, that they have no cumulative effect, and that they are as separate as the works of a modern novelist.

17. The primary purpose of the passage is to

(A) discuss the validity of a hypothesis
(B) summarize a system of general principles
(C) propose guidelines for future argument
(D) stipulate conditions for acceptance of an interpretation
(E) deny accusations about an apparent contradiction

18. It can be inferred from the passage that the author believes which of the following about Malory's works?

I. There are meaningful links between and among the romances.
II. The subtleties of the romances are obscured when they are taken as one work.
III. Any contradictions in chronology among the romances are less important than their overall unity.

(A) I only
(B) III only
(C) I and III only
(D) II and III only
(E) I, II, and III

19. The author of the passage concedes which of the following about the Vinaver theory?

(A) It gives a clearer understanding of the unity of Malory's romances.
(B) It demonstrates the irrationality of considering Malory's romances to be unified.
(C) It establishes acceptable links between Malory's romances and modern novels.
(D) It unifies earlier and later theories concerning the chronology of Malory's romances.
(E) It makes valid and subtle comments about Malory's romances.

20. It can be inferred from the passage that, in evaluating the Vinaver theory, some critics were

(A) frequently misled by the inconsistencies in Malory's work
(B) initially biased by previous interpretations of Malory's work
(C) conceptually displeased by the general interpretation that Vinaver rejected
(D) generally in agreement with Vinaver's comparisons between Malory and modern novelists
(E) originally skeptical about Vinaver's early conclusions with respect to modern novels

GO ON TO THE NEXT PAGE.

We can distinguish three different realms of matter, three levels on the quantum ladder. The first is the atomic realm, which includes the world of atoms, their interactions, and the structures that are formed by them, such as molecules, liquids and solids, and gases and plasmas. This realm includes all the phenomena of atomic physics, chemistry, and, in a certain sense, biology. The energy exchanges taking place in this realm are of a relatively low order. If these exchanges are below one electron volt, such as in the collisions between molecules of the air in a room, then atoms and molecules can be regarded as elementary particles. That is, they have "conditional elementarity" because they keep their identity and do not change in any collisions or in other processes at these low energy exchanges. If one goes to higher energy exchanges, say 10^4 electron volts, then atoms and molecules will decompose into nuclei and electrons; at this level, the latter particles must be considered as elementary. We find examples of structures and processes of this first rung of the quantum ladder on Earth, on planets, and on the surfaces of stars.

The next rung is the nuclear realm. Here the energy exchanges are much higher, on the order of millions of electron volts. As long as we are dealing with phenomena in the atomic realm, such amounts of energy are unavailable, and most nuclei are inert: they do not change. However, if one applies energies of millions of electron volts, nuclear reactions, fission and fusion, and the processes of radioactivity occur; our elementary particles then are protons, neutrons, and electrons. In addition, nuclear processes produce neutrinos, particles that have no detectable mass or charge. In the universe, energies at this level are available in the centers of stars and in star explosions. Indeed, the energy radiated by the stars is produced by nuclear reactions. The natural radioactivity we find on Earth is the long-lived remnant of the time when now-earthly matter was expelled into space by a major stellar explosion.

The third rung of the quantum ladder is the subnuclear realm. Here we are dealing with energy exchanges of many billions of electron volts. We encounter excited nucleons, new types of particles such as mesons, heavy electrons, quarks, and gluons, and also antimatter in large quantities. The gluons are the quanta, or smallest units, of the force (the strong force) that keeps the quarks together. As long as we are dealing with the atomic or nuclear realm, these new types of particles do not occur and the nucleons remain inert. But at subnuclear energy levels, the nucleons and mesons appear to be composed of quarks, so that the quarks and gluons figure as elementary particles.

21. The primary topic of the passage is which of the following?

(A) The interaction of the realms on the quantum ladder
(B) Atomic structures found on Earth, on other planets, and on the surfaces of stars
(C) Levels of energy that are released in nuclear reactions on Earth and in stars
(D) Particles and processes found in the atomic, nuclear, and subnuclear realms
(E) New types of particles occurring in the atomic realm

GO ON TO THE NEXT PAGE.

22. According to the passage, radioactivity that occurs naturally on Earth is the result of

(A) the production of particles that have no detectable mass or electric charge
(B) high energy exchanges on the nuclear level that occurred in an ancient explosion in a star
(C) processes that occur in the center of the Sun, which emits radiation to the Earth
(D) phenomena in the atomic realm that cause atoms and molecules to decompose into nuclei and electrons
(E) high-voltage discharges of electricity that took place in the atmosphere of the Earth shortly after the Earth was formed

23. The author organizes the passage by

(A) making distinctions between two groups of particles, those that are elementary and those that are composite
(B) explaining three methods of transferring energy to atoms and to the smaller particles that constitute atoms
(C) describing several levels of processes, increasing in energy, and corresponding sets of particles, generally decreasing in size
(D) putting forth an argument concerning energy levels and then conceding that several qualifications of that argument are necessary
(E) making several successive refinements of a definition of elementarity on the basis of several groups of experimental results

24. According to the passage, which of the following can be found in the atomic realm?

(A) More than one level of energy exchange
(B) Exactly one elementary particle
(C) Exactly three kinds of atomic structures
(D) Three levels on the quantum ladder
(E) No particles smaller than atoms

25. According to the author, gluons are <u>not</u>

(A) considered to be detectable
(B) produced in nuclear reactions
(C) encountered in subnuclear energy exchanges
(D) related to the strong force
(E) found to be conditionally elementary

26. At a higher energy level than the subnuclear level described, if such a higher level exists, it can be expected on the basis of the information in the passage that there would probably be

(A) excited nucleons
(B) elementary mesons
(C) a kind of particle without detectable mass or charge
(D) exchanges of energy on the order of millions of electron volts
(E) another set of elementary particles

27. The passage speaks of particles as having conditional elementarity if they

(A) remain unchanged at a given level of energy exchange
(B) cannot be decomposed into smaller constituents
(C) are mathematically simpler than some other set of particles
(D) release energy at a low level in collisions
(E) belong to the nuclear level on the quantum ladder

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. PARTITION: (A) unify (B) mollify (C) nullify (D) indemnify (E) fortify

29. ABHOR: (A) greatly admire (B) promise absolutely (C) inspire (D) credit (E) improve

30. TAINTED: (A) available (B) strident (C) conspicuous (D) wholesome (E) insensible

31. CARDINAL: (A) abstract (B) elusive (C) subtle (D) minor (E) miniature

32. ESTRANGEMENT: (A) reconciliation (B) dissemblance (C) consolation (D) chaotic situation (E) continuous negotiation

33. ABATE: (A) attach (B) alter (C) absent (D) assist (E) augment

34. DOFF: (A) raze (B) don (C) ply (D) clasp tightly (E) hide carefully

35. ERUDITE: (A) unsettled (B) unfettered (C) untalented (D) untitled (E) unlettered

36. GARRULITY: (A) servility (B) forbearance (C) peacefulness (D) constancy (E) taciturnity

37. SCOTCH: (A) entrust (B) emphasize (C) encourage (D) renovate (E) unfasten

38. LIBERTINE: (A) serf (B) miser (C) prisoner (D) ascetic (E) authoritarian

SECTION 3

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

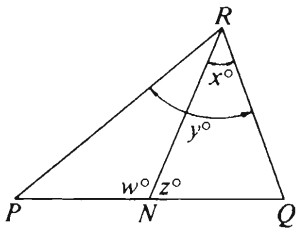
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

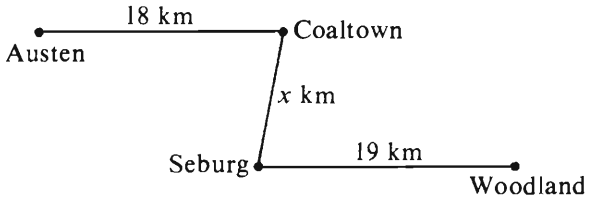


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	The cost of 3 pounds of peaches at \$0.34 per pound	\$1.00
2.	$\frac{3}{4} - \frac{2}{3}$	$\frac{1}{12}$



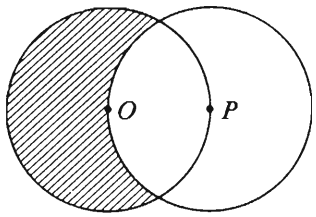
The map shows the only roads that connect the four towns and shows the distance along each road.

3.	The road distance between Austen and Seburg	The road distance between Coaltown and Woodland
4.	$5^3 + 5^3$	10^3

$xy = 18$ and $x + y = 9$

5.	x	y

	Column A	Column B

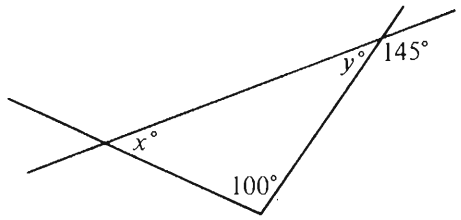


The circles above, with centers O and P, each have radius r.

6.	Twice the area of the shaded region	The area of the circular region with center P

$y = -3$

7.	$y^2 - 3y - 2$	$y^2 + 3y + 10$



8.	x	y

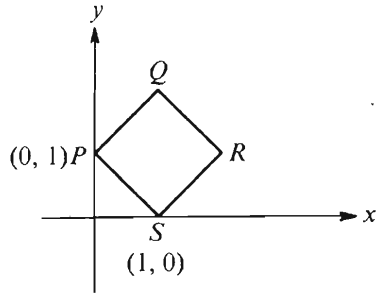
$0 < x < y < 1$

9.	xy	$x + y$

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
10.	The area of a rectangular region with sides of lengths a and 5	The area of a rectangular region with sides of lengths $(a + 1)$ and 4
11.	$\dfrac{2\frac{1}{2}}{3\frac{3}{4}}$	$\dfrac{6\frac{1}{2}}{9\frac{3}{4}}$



In the rectangular coordinate system above, $PQRS$ is a square.

12. The perimeter of $PQRS$

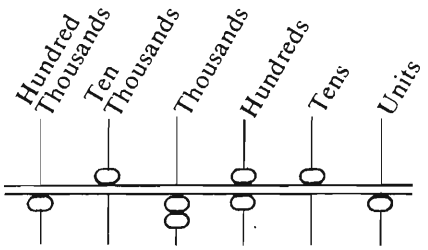
	Column A	Column B
	When integer n is divided by 9, the remainder is 2.	
13.	The remainder when n is divided by 3	2
	A certain store sells each pencil at the same price regardless of the number of pencils sold. k of these pencils have a total price of q cents, and r of these pencils have a total price of s cents.	
14.	ks	qr
15.	$a^2 + b^2$	$(a + b)^2$

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

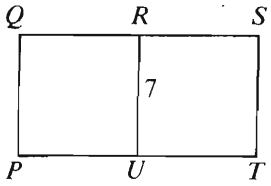
16. On a number line, what is the distance between -3 and 7 ?

(A) 10 (B) 8 (C) 7 (D) 5 (E) 4



17. In the figure above, each of the beads above the horizontal bar represents 5 times the place value indicated and each of the beads below the bar represents 1 times the place value indicated. What number is represented by the figure above?

(A) 512,651
(B) 512,615
(C) 156,651
(D) 152,651
(E) 152,251



18. In the figure above, if $PQRU$ and $URST$ are squares, what is the area of rectangular region $PQST$?

(A) 28 (B) 42 (C) 49 (D) 98
(E) It cannot be determined from the information given.

19. Each of the following is the square of an integer EXCEPT

(A) 81 (B) 100 (C) 121
(D) 196 (E) 215

20. The average (arithmetic mean) of two numbers is $2x + 1$. If one of the numbers is x, then the other number is

(A) $x - 1$
(B) $x + 1$
(C) $2x - 1$
(D) $3x + 1$
(E) $3x + 2$

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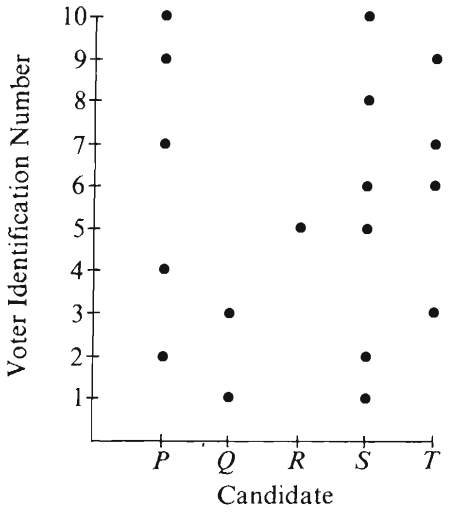
* Questions 21-25 refer to the following graph.

RESULTS OF A SAMPLE OF VOTERS IN DISTRICT X



The graph above shows how a sample of 10 different voters (vertical axis) voted for 5 different candidates (horizontal axis). Each voter voted for either one or two of the five candidates. (No voter voted twice for the same candidate.) The two candidates receiving the most votes were the winners. The sample constituted 5 percent of those in the district who voted, and the number of votes in the district for each candidate was in the same proportion as the number of votes in the sample for each candidate.

21. How many people in the sample voted for both winners?

(A) One
(B) Two
(C) Three
(D) Five
(E) Six

22. What fraction of the total number of votes cast did the two winners receive?

(A) $\frac{11}{18}$ (B) $\frac{11}{20}$ (C) $\frac{1}{2}$ (D) $\frac{1}{3}$ (E) $\frac{3}{10}$

23. What percent of the sample voted for at least one of the two winners?

(A) 11%
(B) 20%
(C) 55%
(D) 61%
(E) 90%

24. How many votes were cast in district X?

(A) 18 (B) 90 (C) 200
(D) 360 (E) 400

25. In district X, candidate T received how many more votes than candidate Q?

(A) 2 (B) 10 (C) 20 (D) 40 (E) 80

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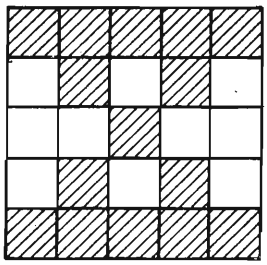
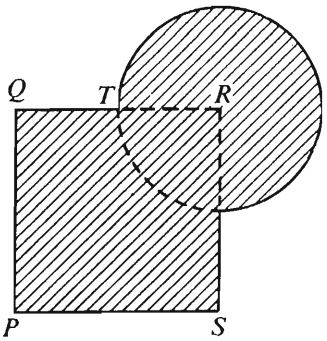


26. In the figure above, the number of shaded squares is what percent greater than the number of unshaded squares?

(A) 25% (B) 40% (C) 50%
(D) 60% (E) 75%

27. If x, y, and z are three different positive integers less than 10, what is the greatest possible value of the expression $\frac{x-y}{z}$?

(A) 8
(B) 7
(C) 6
(D) 5
(E) 4



28. In the figure above, vertex R of square $PQRS$ is the center of the circle. If $QT = TR = 3$, what is the area of the shaded region?

(A) $9 + \frac{27}{4}\pi$
(B) $9 + 27\pi$
(C) $36 + \frac{27}{4}\pi$
(D) $36 + 9\pi$
(E) $36 + 27\pi$

29. If p is a prime number greater than 11, and p is the sum of the two prime numbers x and y, then x could be which of the following?

(A) 2 (B) 5 (C) 7 (D) 9 (E) 13

30. If 18 identical machines required 40 days to complete a job, how many fewer days would have been required to do the job if 6 additional machines of the same type had been used from the beginning?

(A) 10
(B) $13\frac{1}{3}$
(C) 16
(D) $26\frac{2}{3}$
(E) 36

SECTION 4

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

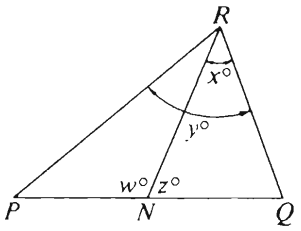
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

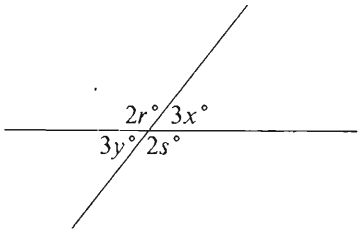


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	The least common denominator of $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$	15



2.	$r + y$	$s + x$

$$9x + 9 = 90$$

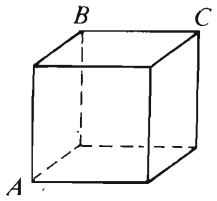
3.	x	9

Toni bought n dozen eggs for \$12 and m half gallons of milk for \$6.

4.	The price Toni paid for a dozen eggs	The price Toni paid for a half gallon of milk

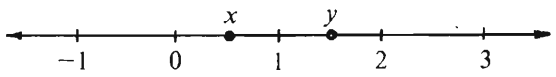
5.	$2 + \sqrt{3}$	$1 + \sqrt{4}$

	Column A	Column B



The figure above is a cube.

6.	The distance from A to B	The distance from A to C
7.	$(2.3)(12.45)$	$(0.23)(124.5)$



8.	$2x + y$	$2y + x$

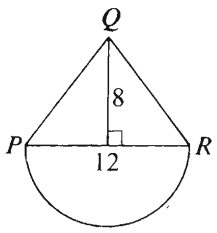
In $\triangle RST$, $RS = ST$ and the measure of $\angle RST$ is 20°.

9.	The measure of $\angle TRS$	80°

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	x and y are positive numbers.	
10.	$\left(\frac{x+y}{2}\right)^2 - \left(\frac{x-y}{2}\right)^2$	0



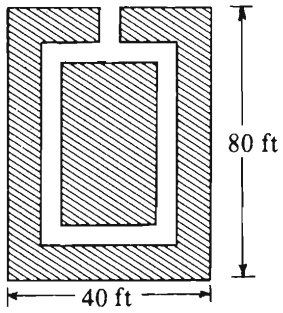
The diameter of the semicircle is 12 and the height of the triangle is 8.

11.	The area of the semicircular region	The area of triangular region PQR

Fahrenheit temperatures recorded at location X at 4-hour intervals were $-8°$, $-5°$, $7°$, $5°$, $3°$, $1°$.

12.	The average (arithmetic mean) of the temperatures recorded above	1° F

	Column A	Column B



The diagram represents a rectangular garden. The shaded regions are planted in flowers, and the unshaded region is a walk 2 feet wide. All angles are right angles.

13.	The sum of the areas of the shaded regions	2,800 square feet
14.	8^7	$8^6 + 2 \cdot 8^6 + 4 \cdot 8^6$
	$x \neq 0$	
15.	$\frac{19}{20}x$	$\frac{20}{19}\left(\frac{1}{x}\right)$

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. If $a = 3b + c$, what is the value of b when $a = 17$ and $c = 2$?

(A) 5

(B) $6\frac{1}{3}$

(C) 12

(D) 15

(E) 45

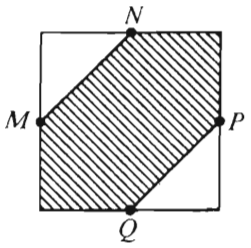
17. $\dfrac{\frac{1}{3}}{6} =$

(A) 2 (B) $\frac{1}{2}$ (C) $\frac{1}{3}$ (D) $\frac{1}{9}$ (E) $\frac{1}{18}$

18. If $4x - 2y = 8$, what is the value of $2x - y$?

(A) 3 (B) 4 (C) 5 (D) 6

(E) It cannot be determined from the information given.



19. In the square above, M, N, P, and Q are midpoints of the sides. If the area of the square region is A, what is the area of the shaded region?

(A) $\frac{1}{3}A$

(B) $\frac{1}{2}A$

(C) $\frac{2}{3}A$

(D) $\frac{3}{4}A$

(E) $\frac{7}{8}A$

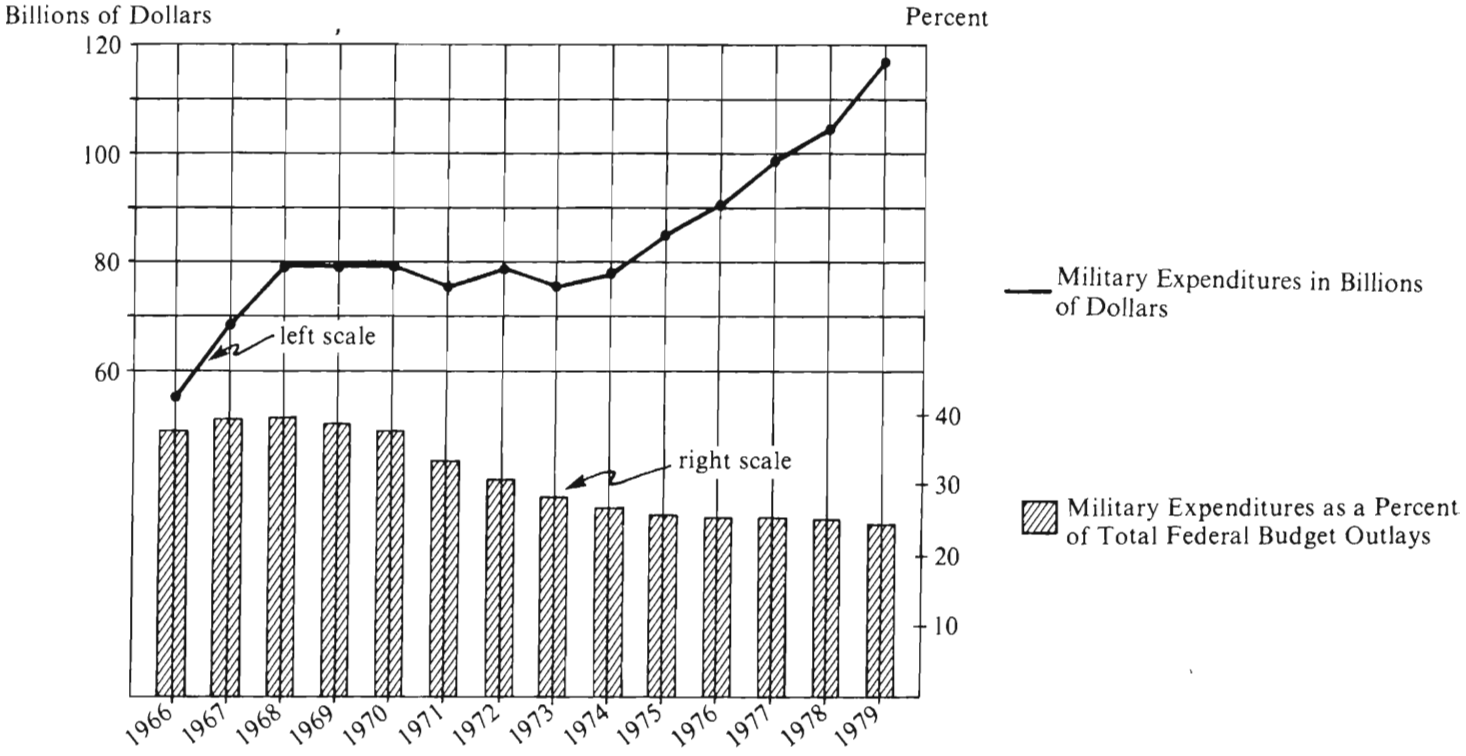
20. What is the least number x for which $(2x + 1)(x - 2) = 0$?

(A) -2 (B) -1 (C) $-\frac{1}{2}$ (D) $\frac{1}{2}$ (E) 2

GO ON TO THE NEXT PAGE.

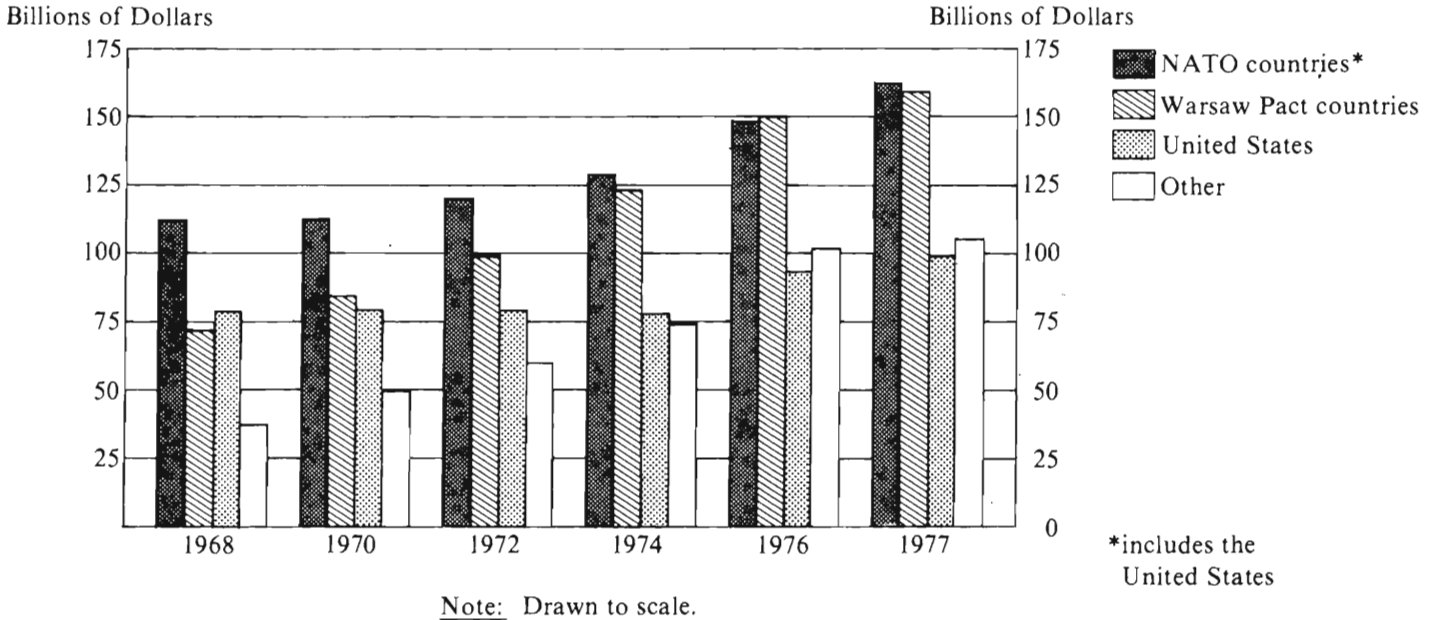
Questions 21-25 refer to the following graphs.

FEDERAL BUDGET OUTLAYS OF THE UNITED STATES
FOR MILITARY EXPENDITURES, 1966-1979



Note: Drawn to scale.

WORLDWIDE MILITARY EXPENDITURES: 1968 TO 1977



Note: Drawn to scale.

GO ON TO THE NEXT PAGE.

21. In 1968 the military expenditures of the United States were approximately how many billion dollars?

(A) 100 (B) 80 (C) 70 (D) 60 (E) 40

22. For the year in which the United States had approximately 70 billion dollars in military expenditures, that amount was approximately what percent of total federal budget outlays?

(A) 30%
(B) 40%
(C) 50%
(D) 60%
(E) 70%

23. In which of the following years was the amount of United States military expenditures approximately 80 percent of the amount for 1978 ?

(A) 1967 (B) 1968 (C) 1973
(D) 1975 (E) 1976

24. In 1977, federal budget outlays for the United States totaled approximately how many billion dollars?

(A) 200
(B) 300
(C) 400
(D) 500
(E) 600

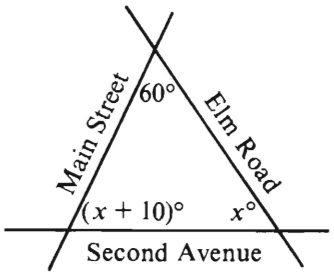
25. In which of the years shown were combined military expenditures for the NATO countries other than the United States most nearly equal to 50 billion dollars?

(A) 1968 (B) 1972 (C) 1974
(D) 1976 (E) 1977

GO ON TO THE NEXT PAGE.

26. In a certain club for men and women, 40 percent of the members are men. If 20 percent of the men and 10 percent of the women members went to a theater performance, what percent of the total membership went to the performance?

(A) 12% (B) 14% (C) 15%
(D) 16% (E) 30%



27. The figure above shows the angles of intersection of three streets. At what angle do Second Avenue and Main Street intersect?

(A) 50°
(B) 55°
(C) 65°
(D) 70°
(E) 75°

28. If x, y, and z are consecutive integers and $x < y < z$, which of the following must be true?

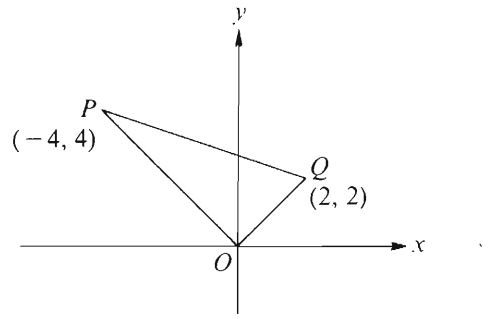
I. xyz is even.
II. $x + y + z$ is even.
III. $(x + y)(y + z)$ is odd.

(A) None
(B) I only
(C) II only
(D) I and III only
(E) I, II, and III

GO ON TO THE NEXT PAGE.

29. If $<n> = \frac{n(n+1)}{2}$ for all integers n, and $m = <5>$, then $<m> =$

(A) 120
(B) 225
(C) 240
(D) 420
(E) 840



30. In the figure above, what is the perimeter of triangle OPQ?

(A) $4 + 2\sqrt{2}$
(B) $8 + 4\sqrt{2}$
(C) $6 + 2\sqrt{5}$
(D) $6 + 6\sqrt{2}$
(E) $6\sqrt{2} + 2\sqrt{10}$

SECTION 5
Time—30 minutes
25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-6

Five ships—J, K, L, M, and N—are to be unloaded on 5 consecutive days beginning on Monday and ending on Friday according to the following conditions:

Each ship takes exactly one day to unload.
K must be unloaded on a day preceding the days M and N are unloaded.
L cannot be unloaded on a Tuesday.
M must be the second ship unloaded after J is unloaded.

1. If M is unloaded on Friday, which of the following must be true?

(A) J is unloaded on Wednesday.
(B) K is unloaded on Tuesday.
(C) L is unloaded on Monday.
(D) L is unloaded on Thursday.
(E) N is unloaded on Thursday.

2. If K, M, and N are to be unloaded one immediately after the other in that order, the two days on which J can be unloaded are

(A) Monday and Tuesday
(B) Monday and Friday
(C) Tuesday and Wednesday
(D) Wednesday and Friday
(E) Thursday and Friday

3. If L is unloaded on the day immediately after the day J is unloaded, which of the following must be true?

(A) J is unloaded on Wednesday.
(B) K is unloaded on Monday.
(C) L is unloaded on Thursday.
(D) M is unloaded on Friday.
(E) N is unloaded on Tuesday.

4. If J is unloaded on Monday, which of the following must be true?

(A) L is unloaded before K.
(B) L is unloaded before M.
(C) K is unloaded on Tuesday.
(D) L is unloaded on Thursday.
(E) N is unloaded on Thursday.

5. N can be unloaded any day of the week EXCEPT

(A) Monday
(B) Tuesday
(C) Wednesday
(D) Thursday
(E) Friday

6. On which of the following days can any one of the five ships be unloaded?

(A) Monday
(B) Tuesday
(C) Wednesday
(D) Thursday
(E) Friday

GO ON TO THE NEXT PAGE.

7. Infection is the biggest threat to the life of a burn patient. The skin, the body's natural barrier against bacteria, is damaged or gone in the burned areas. The bacteria that are a threat are unpredictable in both variety and number. Moreover, those found affecting any one patient may change completely from one day to the next. The standard treatment, therefore, is the administration of broad-spectrum antibiotics.

   Considering only the information given about burn patients in the passage above, which of the following is most likely to enhance the effectiveness of the standard treatment of a burn patient?

   (A) Keeping the patient in an air-conditioned room until recovery is assured
   (B) Keeping the areas affected by burns as dry as possible
   (C) Continuously monitoring the patient's vital signs with electronic equipment
   (D) Feeding the patient a diet extra rich in calories
   (E) Keeping the patient in a maximally sterile environment

8. Dormitories range from two to six stories in height. If a dormitory room is above the second floor, it has a fire escape.

   If the statements above are true, which of the following must also be true?

   (A) Second-floor dormitory rooms do not have fire escapes.
   (B) Third-floor dormitory rooms do not have fire escapes.
   (C) Only dormitory rooms above the second floor have fire escapes.
   (D) Fourth-floor dormitory rooms have fire escapes.
   (E) Some two-story dormitories do not have fire escapes.

9. The garment industry is labor-intensive; the production of garments requires the employment of a relatively large number of people. The auto industry is capital-intensive; a large amount of money is invested in elaborate equipment run by a relatively small number of people. If fringe benefits are not considered, a typical United States garment worker in 1979 earned 46 percent of a typical auto worker's wages.

   Which of the following, if true, is likely to be among the factors that account for the disparity between auto workers' and garment workers' wages?

   (A) There is generally less variation among the wages of garment industry workers than among those of auto industry workers.
   (B) Wage increases in the auto industry have a smaller effect on manufacturers' total costs than do wage increases in the garment industry.
   (C) The fringe benefits that auto makers provide for their employees are more comprehensive than are those provided for garment workers.
   (D) The auto industry faces more competition from companies outside the United States paying low wages than does the garment industry.
   (E) The auto industry employs a larger total number of workers than does the garment industry.

GO ON TO THE NEXT PAGE.

Questions 10-15

Exactly twelve books are arranged from left to right on a shelf.
Of the twelve books, four are small paperback books, two are large paperback books, three are clothbound books, and three are leather-bound books.
The four small paperback books are next to each other, and the three leather-bound books are next to each other.
The first (leftmost) book and the twelfth (rightmost) book are paperback books.

10. If the third book is a small paperback book and each large paperback book is next to a leather-bound book, which of the following books must be a large paperback book?

    (A) The first
    (B) The second
    (C) The sixth
    (D) The eighth
    (E) The eleventh

11. If the twelfth book is a small paperback book, the fourth book is a leather-bound book, and no clothbound book is next to another clothbound book, which of the following books must be a large paperback book?

    (A) The second
    (B) The third
    (C) The fifth
    (D) The sixth
    (E) The seventh

12. If the first book is a small paperback book, the clothbound books are next to each other, and the eleventh book is leather bound, which of the following books can be a large paperback book?

    (A) The fourth
    (B) The fifth
    (C) The sixth
    (D) The ninth
    (E) The tenth

13. If the first book is a large paperback book, the second book is a small paperback book, and the seventh book is a leather-bound book, which of the following can be true?

    (A) The fourth book is a clothbound book.
    (B) The fifth book is a leather-bound book.
    (C) The sixth book is a large paperback book.
    (D) The eighth book is a clothbound book.
    (E) The ninth book is a clothbound book.

14. If a large paperback book is at each end of the row and a small paperback book is next to a leather-bound book, which of the following books can be a clothbound book?

    (A) The fourth
    (B) The fifth
    (C) The sixth
    (D) The seventh
    (E) The eighth

15. If a large paperback book is at each end of the row and no clothbound book is next to a small paperback book, which of the following must be true?

    (A) The second book is a small paperback book.
    (B) The fourth book is a clothbound book.
    (C) The sixth book is a leather-bound book.
    (D) The eighth book is a leather-bound book.
    (E) The tenth book is a clothbound book.

GO ON TO THE NEXT PAGE.

Questions 16-19

A plumber and an electrician have been hired to install the necessary plumbing and electrical fixtures in a new house. Each worker has four jobs, and each job takes exactly one day to complete. The workers will work together on four consecutive days, beginning on Monday. The work schedule for the plumber's jobs—G, H, I, and J—and for the electrician's jobs—L, M, N, and O—can be arranged at the convenience of each so long as the following conditions are met:

G and M cannot be done on the same day.
H and N must be done on the same day.
I must be done on the day immediately preceding the day on which G is done.
O must be done on a day preceding the day on which N is done.

16. Which of the following is an acceptable schedule for the plumber's jobs, beginning on Monday?

(A) G, H, J, I
(B) H, I, J, G
(C) H, J, G, I
(D) I, G, J, H
(E) J, H, G, I

17. Which of the following jobs CANNOT be scheduled for Monday?

(A) H
(B) I
(C) J
(D) L
(E) O

18. If H and N are scheduled for Wednesday, which of the following could be true?

(A) G is scheduled for Thursday.
(B) J is scheduled for Monday.
(C) L is scheduled for Monday.
(D) M is scheduled for Tuesday.
(E) O is scheduled for Thursday.

19. If J and M are scheduled for Thursday, which of the following must be true?

(A) G is scheduled for Monday.
(B) I is scheduled for Tuesday.
(C) L is scheduled for Wednesday.
(D) N is scheduled for Wednesday.
(E) O is scheduled for Monday.

Questions 20-22

A residential subdivision is accessible to vehicular traffic only as specified below:

All eight streets are one-way streets.
Access to the subdivision is at a single point F.
Exit from the subdivision is at a single point G.
The street intersections within the subdivision are W, X, Y, and Z.
Separate streets run directly

from F to W,
from W to X,
from W to Y,
from X to Z,
from X to W,
from Y to X,
from Z to Y, and
from Z to G.

20. Which of the following describes a possible route from F to G, including each of the intersections on that route?

(A) F – W – Z – G
(B) F – Y – X – G
(C) F – W – X – Y – G
(D) F – W – Y – X – G
(E) F – W – X – Z – G

21. For which of the following trips are there two alternative routes that do not have a street in common and do not go outside the subdivision?

(A) From W to Z
(B) From X to Y
(C) From X to Z
(D) From Y to W
(E) From Z to W

22. If, in traveling from F to G, a vehicle passes through no intersection more than once, which of the following could be, but need not be, a portion of that trip?

(A) From F to W
(B) From X to W
(C) From X to Z
(D) From Y to X
(E) From Z to Y

GO ON TO THE NEXT PAGE.

23. It was long thought that a now-rare disease of the joints, alkaptonuria, was epidemic in Egypt 2,500 years ago. Evidence came from the high proportion of mummies from that period showing symptoms of the disease. Recently, however, chemical analyses of skeletons have led scientists to propose that the joint damage was actually caused by chemicals used by Egyptian embalmers.

Which of the following, if true, would additionally weaken the traditional view that alkaptonuria afflicted many Egyptians 2,500 years ago?

(A) X-rays of the mummies showed shadows that clearly suggested joint damage, and recent inspection of the skeletons has confirmed that hypothesis.
(B) Although alkaptonuria is a disease that can be inherited, it did not appear in the descendants of the Egyptian population in which the symptoms were found.
(C) Egyptian embalming methods were highly secret, and scientists are still not certain of the nature of some of the chemicals that were used.
(D) Possible evidence of alkaptonuria has been pointed out in pictures representing the human figure found on artifacts left by other Middle Eastern cultures of that period.
(E) Some mummies of that period show no evidence of joint damage at all.

24. The Census Bureau reported that the median family income, after adjustment for inflation, increased 1.6 percent in 1983. Poverty normally declines when family income goes up, but the national poverty rate remained at its highest level in eighteen years in 1983. The Census Bureau offered two possible explanations: the lingering effects of the deep and lengthy 1981-1982 recession, and increases in the number of people living in families headed by women and in the number of adults not living with any relatives. Both groups are likely to be poorer than the population as a whole.

Which of the following conclusions can be properly drawn from this report?

(A) The national poverty rate has increased steadily over the last eighteen years.
(B) The national poverty rate will increase when there are lingering effects of an earlier recession.
(C) The median family income can increase even though the family income of some subgroups within the population declines or fails to increase.
(D) The category of adults not living with any relatives is the most critical group in the determination of whether the economy has improved.
(E) The median family income is affected more by changes in family patterns than by the extent of expansion or recession of the national economy.

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25. For many people in the United States who are concerned about the cost of heating homes and businesses, wood has become an alternative energy source to coal, oil, and gas. Nevertheless, wood will never supply more than a modest fraction of our continuing energy needs.

Which of the following, if true, does NOT support the claim made in the last sentence in the passage above?

(A) There are many competing uses for a finite supply of wood, and suppliers give the lumber and paper industries a higher priority than they give individual consumers.

(B) Wood produces thick smoke in burning, and its extensive use in densely populated cities would violate federal antipollution guidelines.

(C) There are relatively narrow limits to how far wood can be trucked before it becomes more economical to burn the gasoline used for transportation instead of the wood.

(D) Most apartment dwellers do not have adequate storage space for the amount of wood necessary to supply energy for heating.

(E) Most commercial users of energy are located within range of a wood supply, and two-thirds of United States homes are located outside of metropolitan areas.

SECTION 6
Time—30 minutes
25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-5

A florist has exactly seven varieties of flowers—P, Q, R, S, T, U, and V—from which she must select combinations of exactly five varieties with which to make flower arrangements. Any combination of the five varieties that conforms to all of the following conditions is acceptable:

If P is used in an arrangement, T cannot be used in that arrangement.
If Q is used in an arrangement, U must also be used in that arrangement.
If R is used in an arrangement, T must also be used in that arrangement.

1. Which of the following is an acceptable combination of varieties that the florist can select for an arrangement?

(A) P, Q, S, T, U
(B) P, Q, R, U, V
(C) P, S, T, U, V
(D) Q, R, S, U, V
(E) Q, R, S, T, U

2. If the florist selects variety R to be included in an arrangement, which of the following must be true of that arrangement?

(A) P is not used.
(B) U is not used.
(C) Q is used.
(D) S is used.
(E) V is used.

3. If variety P is used in an arrangement, which of the following CANNOT be used in that arrangement?

(A) Q (B) R (C) S (D) U (E) V

4. If the florist does not select variety V for an arrangement, which of the following also CANNOT be selected?

(A) P (B) Q (C) R (D) S (E) T

5. Which of the following substitutions can the florist always make without violating the conditions governing flower combination, provided the variety mentioned first was not, and the variety mentioned second was, originally going to be used in the arrangement concerned?

(A) P for R
(B) Q for U
(C) R for T
(D) S for V
(E) V for T

GO ON TO THE NEXT PAGE.

*6. Currently, the number of first-time admissions of individuals diagnosed as manic-depressives to hospitals in Great Britain exceeds by nine times the number of admissions of such patients to public and private hospitals in the United States, even though the population size of the United States is many times that of Great Britain.

Which of the following, if true, would be most useful to an attempt to explain the situation described above?

(A) The term manic-depressive refers to a wider range of mentally ill patients in Great Britain than it does in the United States.
(B) The admission rate in the United States includes those individuals who visit clinics for the first time as well as those who are admitted directly to hospitals.
(C) A small percentage of patients diagnosed as manic-depressive in Great Britain are admitted to private nursing homes rather than hospitals.
(D) The variety of training institutions in psychology in the United States is greater than in Great Britain, reflecting the variety of schools of psychology that have developed in the United States.
(E) Seeking professional assistance for mental health problems no longer carries a social stigma in the United States, as it once did.

7. Some soil scientists have asserted that decaying matter on the forest floor is a far greater source of the acidity in mountain lakes than is the acid rain that falls on these lakes. Therefore, they contend, reducing acid rain will not significantly reduce the acidity levels of mountain lakes.

Which of the following statements, if true, most seriously weakens the argument above?

(A) It is natural for mountain lakes to have acidity levels higher than those of other lakes.
(B) The harmful effects of increased acidity levels in lakes have been greatly underestimated.
(C) Acid rain is found in urban and heavily industrialized regions of the country.
(D) There is much disagreement among soil scientists about the causes of acid rain.
(E) While plant life remains, acid rain significantly increases the amount of decaying organic matter in natural environments.

8. Unlike other forms of narrative art, a play, to be successful, must give pleasure to its immediate audience by reflecting the concerns and values of that audience. A novel can achieve success over months or even years, but a play must be a hit or perish. Successful drama of the Restoration period, therefore, is a good index to the typical tastes and attitudes of its time.

The author of the passage above assumes that

(A) plays written for Restoration audiences do not appeal to modern audiences
(B) plays are superior to novels as a form of narrative art
(C) Restoration audiences were representative of the whole population of their time
(D) playgoers and novel readers are typically distinct and exclusive groups
(E) Restoration drama achieved popular success at the expense of critical success

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Questions 9-13

A game has been invented that involves a player's directing a ball through four arches—1, 2, 3, and 4 in that order. On a certain day, the game is to be played on a circular lawn that has four major landmarks located around the border of the lawn at the points of the compass: to the north a lilac bush, to the east an oak tree, to the south a rock garden, and to the west a small pond. The arches can be placed on the lawn in any numerical arrangement as long as the following conditions are met:

The four arches must be positioned at equal distances around the border of the lawn, and each arch must stand on the border midway between two adjacent landmarks.
The lilac bush must be one of the landmarks that stand nearest to arch 1.
The rock garden must be one of the landmarks that stand nearest to arch 2.
The pond must be one of the landmarks that stand nearest to arch 4.
The pond cannot be one of the landmarks that stand nearest to arch 1.

9. Which of the following is a possible arrangement of the four arches as they are positioned in relation to the four landmarks?

(A) Lilac bush -1- oak tree -3- rock garden -4- pond -2- lilac bush
(B) Lilac bush -1- oak tree -3- rock garden -2- pond -4- lilac bush
(C) Lilac bush -1- oak tree -4- rock garden -2- pond -3- lilac bush
(D) Lilac bush -3- oak tree -2- rock garden -4- pond -1- lilac bush
(E) Lilac bush -3- oak tree -1- rock garden -2- pond -4- lilac bush

10. Which of the arches can be placed directly between the rock garden and the pond?

(A) 2 but not 1, 3, or 4
(B) 3 but not 1, 2, or 4
(C) 2 or 3 but not 1 or 4
(D) 2 or 4 but not 1 or 3
(E) 2, 3, or 4 but not 1

11. If arch 3 is one of the arches nearest to the rock garden, which of the following must be true?

(A) Arch 2 is one of the arches nearest to the oak tree.
(B) Arch 2 is one of the arches nearest to the pond.
(C) Arch 3 is one of the arches nearest to the oak tree.
(D) Arch 4 is one of the arches nearest to the lilac bush.
(E) Arch 4 is one of the arches nearest to the rock garden.

12. If arch 3 is separated from arch 4 by exactly one landmark, any of the following can be true EXCEPT:

(A) Arch 2 is one of the arches nearest to the pond.
(B) Arch 3 is one of the arches nearest to the rock garden.
(C) Arch 3 is one of the arches nearest to the pond.
(D) Arch 4 is one of the arches nearest to the lilac bush.
(E) Arch 4 is one of the arches nearest to the rock garden.

13. Which of the following placements of one of the arches allows more than one possible arrangement of the arches on the lawn?

(A) Arch 2 between the rock garden and the pond
(B) Arch 3 between the lilac bush and the pond
(C) Arch 3 between the rock garden and the pond
(D) Arch 4 between the rock garden and the pond
(E) Arch 4 between the lilac bush and the pond

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Questions 14-18

P, Q, R, S, T are the computers in the five overseas offices of a large multinational corporation. The computers are linked in an unusual manner in order to provide increased security for the data in certain offices. Data can be directly requested only from:

P by Q
P by T
Q by P
R by P
S by Q
S by T
T by R

If a computer can directly request data from another computer, then it can also pass on requests for data to that other computer.

14. Which of the following computers CANNOT request data from any of the other four computers?

(A) P (B) Q (C) R (D) S (E) T

15. Which of the following is a complete and accurate list of computers that can request data from S through exactly one other computer?

(A) P and Q
(B) P and R
(C) Q and R
(D) R and T
(E) P, Q, and T

16. Which of the following requests for data requires the greatest number of intervening requests for data?

(A) A request by P for data from Q
(B) A request by Q for data from R
(C) A request by Q for data from T
(D) A request by R for data from P
(E) A request by R for data from S

17. If computers Q, R, S, and T are the only ones operating, which of the following requests for data can be made, either directly or through one or more of the other computers?

(A) A request by Q for data from T
(B) A request by T for data from R
(C) A request by S for data from Q
(D) A request by R for data from Q
(E) A request by R for data from S

18. If computers P, R, S, and T are the only ones operating, which of the following requests for data can be made NEITHER directly NOR through exactly one of the other operating computers?

(A) A request by P for data from S
(B) A request by P for data from T
(C) A request by P for data from R
(D) A request by R for data from S
(E) A request by T for data from S

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Questions 19-22

A map is being prepared that will represent the following seven provinces of a certain country: Gusaya, Istoria, Jacaranda, Luna, Praz, Serenia, and Venotia.

Gusaya has common borders with all of the other six provinces on the map except Jacaranda.

Istoria has common borders with exactly four other provinces—Gusaya, Jacaranda, Praz, and Venotia.

Jacaranda has common borders with exactly two other provinces—Istoria and Praz.

Luna has common borders with exactly two other provinces—Gusaya and Venotia.

Praz has common borders with exactly three other provinces—Gusaya, Istoria, and Jacaranda.

Serenia has a common border only with Gusaya.

Venotia has common borders with exactly three other provinces—Gusaya, Istoria, and Luna.

Exactly six colors—gold, jade, olive, red, silver, and white—will be used in representing the seven provinces. Each color will be used at least once. Each province will be one solid color on the map. The following restrictions apply to the map's colors:

No province can be the same color as any province bordering on it.

Jade and olive cannot be used for provinces bordering on each other.

Silver and white cannot be used for provinces bordering on each other.

Gusaya must be red.

Istoria must be jade.

19. Which of the following provinces can NEITHER be red NOR be jade on this map?

(A) Istoria
(B) Jacaranda
(C) Luna
(D) Praz
(E) Serenia

20. Which of the following provinces could be olive on this map?

(A) Gusaya
(B) Jacaranda
(C) Praz
(D) Serenia
(E) Venotia

21. If Venotia and Jacaranda are white on the map, Serenia must be

(A) gold
(B) jade
(C) olive
(D) silver
(E) white

22. If Serenia is gold, which of the following provinces must be olive?

(A) Istoria
(B) Jacaranda
(C) Luna
(D) Praz
(E) Venotia

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23. It is important to teach students to use computers effectively. Therefore, students should be taught computer programming in school.

Which of the following, if true, most weakens the argument above?

(A) Only people who use computers effectively are skilled at computer programming.
(B) Only people skilled at computer programming use computers effectively.
(C) Some people who use computers effectively cannot write computer programs.
(D) Some schools teach computer programming more effectively than others.
(E) Most people who are able to program computers use computers effectively.

24. Butterfat gets its yellowish color from carotene, the fat-soluble vitamin A precursor that is also responsible for the color of carrots. Not all butterfat, however, is equally yellow. Some breeds of cows are more efficient than others at converting carotene to the colorless vitamin A.

If butter made from the milk of holstein cows is much paler than that made from the milk of jersey or guernsey cows, then the facts above suggest that

(A) there is less butterfat in the milk of holsteins than in the milk of jerseys or guernseys
(B) there is more vitamin A in the butterfat of holsteins than in the butterfat of jerseys or guernseys
(C) there is more carotene in the butterfat of holsteins than in the butterfat of jerseys or guernseys
(D) holsteins are less efficient converters of carotene than are jerseys or guernseys
(E) the carotene in the milk of holsteins is less fat-soluble than the carotene in the milk of jerseys or guernseys

25. X melts at a higher temperature than P melts.
Y melts at a lower temperature than P melts, but at a higher temperature than Q melts.

If the statements above are true, it can be concluded with certainty that S melts at a higher temperature than Y melts if one knows in addition that

(A) Q and P melt at a higher temperature than S melts
(B) X melts at a higher temperature than S melts
(C) P melts at a lower temperature than S melts
(D) Q melts at the same temperature that S melts
(E) S melts at a higher temperature than Q melts

FOR GENERAL TEST 17 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 1			Section 2		
Number	Answer	P+	Number	Answer	P+
1	C	83	1	C	91
2	A	80	2	D	56
3	C	57	3	D	66
4	B	59	4	A	72
5	E	51	5	B	63
6	C	47	6	B	46
7	C	21	7	B	48
8	C	92	8	B	88
9	A	86	9	C	89
10	E	82	10	D	88
11	B	77	11	A	68
12	A	45	12	C	55
13	D	55	13	E	39
14	E	21	14	D	37
15	E	17	15	B	22
16	A	9	16	A	27
17	D	79	17	A	44
18	D	43	18	C	51
19	B	58	19	E	25
20	C	36	20	B	38
21	E	64	21	D	64
22	B	53	22	B	69
23	A	59	23	C	72
24	C	58	24	A	40
25	B	70	25	B	42
26	C	63	26	E	49
27	D	76	27	A	58
28	A	94	28	A	91
29	C	71	29	A	86
30	A	66	30	D	83
31	A	60	31	D	73
32	D	43	32	A	73
33	A	45	33	E	46
34	B	45	34	B	50
35	D	39	35	E	25
36	A	37	36	E	31
37	E	38	37	C	25
38	E	27	38	D	20

QUANTITATIVE ABILITY					
Section 3			Section 4		
Number	Answer	P+	Number	Answer	P+
1	A	95	1	B	90
2	C	92	2	C	89
3	B	84	3	C	89
4	B	83	4	D	85
5	D	81	5	A	82
6	A	76	6	B	82
7	A	74	7	C	82
8	A	81	8	B	80
9	B	69	9	C	69
10	D	59	10	A	68
11	C	60	11	A	58
12	A	49	12	B	65
13	C	49	13	D	59
14	C	41	14	A	42
15	D	31	15	D	49
16	A	95	16	A	95
17	D	90	17	E	77
18	D	80	18	B	74
19	E	81	19	D	72
20	E	53	20	C	59
21	B	83	21	B	91
22	A	76	22	B	81
23	E	49	23	D	55
24	D	47	24	C	58
25	D	48	25	C	46
26	C	45	26	B	61
27	B	51	27	C	57
28	C	47	28	D	29
29	A	36	29	A	34
30	A	25	30	E	36

ANALYTICAL ABILITY					
Section 5			Section 6		
Number	Answer	P+	Number	Answer	P+
1	A	71	1	E	87
2	A	64	2	A	91
3	B	53	3	B	94
4	C	71	4	A	70
5	A	69	5	D	70
6	C	66	6	A	81
7	E	91	7	E	51
8	D	63	8	C	69
9	B	74	9	B	67
10	D	50	10	E	38
11	E	35	11	D	30
12	B	56	12	A	33
13	E	41	13	E	32
14	A	46	14	D	70
15	C	37	15	B	46
16	D	53	16	C	41
17	A	40	17	E	36
18	C	33	18	A	42
19	D	21	19	D	27
20	E	27	20	D	39
21	B	33	21	D	26
22	D	19	22	C	37
23	B	51	23	C	55
24	C	49	24	B	41
25	E	44	25	C	50

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 17 ONLY AND THE PERCENTS BELOW*

Raw Score	Scaled Scores and Percents Below						Raw Score	Scaled Scores and Percents Below					
	Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below		Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below
73-76	800	99					40	450	43	550	49	720	93
72	790	99					39	440	40	540	46	710	92
71	780	99					38	430	37	530	44	690	89
70	760	99					37	430	37	520	42	680	88
69	750	98					36	420	34	510	39	670	86
68	740	98					35	410	31	490	34	650	84
67	730	97					34	400	28	480	32	640	81
66	720	96					33	390	26	470	30	630	78
65	700	95					32	390	26	460	27	610	74
64	690	94					31	380	24	450	26	600	72
63	680	93					30	370	22	430	21	590	69
62	670	92					29	360	18	420	19	570	64
61	660	91					28	350	17	410	18	560	61
60	650	89	800	98			27	350	17	400	16	540	56
59	640	88	780	97			26	340	15	390	14	530	53
58	630	86	770	95			25	330	13	370	11	520	50
57	610	84	760	94			24	320	11	360	10	500	44
56	600	82	750	92			23	310	10	350	9	490	41
55	590	80	730	89			22	300	8	340	8	470	36
54	580	78	720	87			21	300	8	320	6	460	33
53	570	75	710	85			20	290	7	310	5	440	27
52	560	73	700	83			19	280	6	300	4	420	23
51	550	71	690	81			18	270	4	290	3	410	21
50	540	68	670	77	800	99	17	260	3	280	3	390	16
49	530	65	660	74	800	99	16	250	3	260	2	370	13
48	530	65	650	72	800	99	15	240	2	250	1	360	11
47	520	63	640	71	800	99	14	230	1	240	1	340	9
46	510	60	630	68	790	98	13	220	1	230	1	310	5
45	500	57	610	63	780	98	12	210	1	220	1	290	3
44	490	55	600	61	770	98	11	200	0	200	0	270	2
43	480	52	590	59	760	97	10	200	0	200	0	250	1
42	470	49	580	56	740	95	9	200	0	200	0	240	1
41	460	45	570	53	730	94	8	200	0	200	0	220	1
							0-7	200	0	200	0	200	0

*Percent scoring below the scaled score, based on the performance of the 816,621 examinees who took the General Test between October 1, 1983, and September 30, 1986.

TEST 18

SECTION 1

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Physicists rejected the innovative experimental technique because, although it ------- some problems, it also produced new -------.

   (A) clarified..data
   (B) eased..interpretations
   (C) resolved..complications
   (D) caused..hypotheses
   (E) revealed..inconsistencies

* 2. During a period of protracted illness, the sick can become infirm, ------- both the strength to work and many of the specific skills they once possessed.

   (A) regaining (B) denying (C) pursuing
   (D) insuring (E) losing

3. The pressure of population on available resources is the key to understanding history; consequently, any historical writing that takes no cognizance of ------- facts is ------- flawed.

   (A) demographic..intrinsically
   (B) ecological..marginally
   (C) cultural..substantively
   (D) psychological..philosophically
   (E) political..demonstratively

4. It is puzzling to observe that Jones's novel has recently been criticized for its ------- structure, since commentators have traditionally argued that its most obvious ------- is its relentlessly rigid, indeed schematic, framework.

   (A) attention to..preoccupation
   (B) speculation about..characteristic
   (C) parody of..disparity
   (D) violation of..contradiction
   (E) lack of..flaw

5. It comes as no surprise that societies have codes of behavior; the character of the codes, on the other hand, can often be -------.

   (A) predictable (B) unexpected
   (C) admirable (D) explicit (E) confusing

6. The characterization of historical analysis as a form of fiction is not likely to be received ------- by either historians or literary critics, who agree that history and fiction deal with ------- orders of experience.

   (A) quietly..significant
   (B) enthusiastically..shifting
   (C) passively..unusual
   (D) sympathetically..distinct
   (E) contentiously..realistic

7. For some time now, ------- has been presumed not to exist: the cynical conviction that everybody has an angle is considered wisdom.

   (A) rationality
   (B) flexibility
   (C) diffidence
   (D) disinterestedness
   (E) insincerity

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. STUDY:LEARN :: (A) pervade:encompass
(B) search:find (C) gather:win
(D) agree:keep (E) accumulate:raise

9. CORRAL:HORSES :: (A) den:lions
(B) meadow:sheep (C) herd:cattle
(D) nest:birds (E) coop:chickens

10. LULLABY:SONG ::
(A) narrative:volume
(B) lecture:tutor
(C) paragraph:page
(D) diatribe:discourse
(E) invective:compliment

11. DIE:SHAPING :: (A) glue:attaching
(B) anchor:sailing (C) drill:boring
(D) pedal:propelling (E) ink:printing

12. MERCENARY:MONEY ::
(A) vindictive:revenge
(B) scholarly:library
(C) immaculate:cleanliness
(D) thirsty:water
(E) belligerent:invasion

13. AUTHORITATIVENESS:PUNDITS ::
(A) dedication:signatories
(B) sobriety:executors
(C) sensitivity:literati
(D) recklessness:warriors
(E) allegiance:partisans

14. STRUT:WING :: (A) lever:handle
(B) axle:wheel (C) buttress:wall
(D) beam:rivet (E) well:pipe

15. FAWN:IMPERIOUSNESS ::
(A) equivocate:directness
(B) elaborate:originality
(C) boggle:imagination
(D) manipulate:repression
(E) coddle:permissiveness

16. TROUBLED:DISTRAUGHT ::
(A) annoyed:disillusioned
(B) disturbed:interrupted
(C) covetous:rapacious
(D) outmoded:ostentatious
(E) tranquil:placid

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

The evolution of intelligence among early large mammals of the grasslands was due in great measure to the interaction between two ecologically synchronized groups of these animals, the hunting carnivores and the herbivores that they hunted. The interaction resulting from the differences between predator and prey led to a general improvement in brain functions; however, certain components of intelligence were improved far more than others.

The kind of intelligence favored by the interplay of increasingly smarter catchers and increasingly keener escapers is defined by attention—that aspect of mind carrying consciousness forward from one moment to the next. It ranges from a passive, free-floating awareness to a highly focused, active fixation. The range through these states is mediated by the arousal system, a network of tracts converging from sensory systems to integrating centers in the brain stem. From the more relaxed to the more vigorous levels, sensitivity to novelty is increased. The organism is more awake, more vigilant; this increased vigilance results in the apprehension of ever more subtle signals as the organism becomes more sensitive to its surroundings. The processes of arousal and concentration give attention its direction. Arousal is at first general, with a flooding of impulses in the brain stem; then gradually the activation is channeled. Thus begins concentration, the holding of consistent images. One meaning of intelligence is the way in which these images and other alertly searched information are used in the context of previous experience. Consciousness links past attention to the present and permits the integration of details with perceived ends and purposes.

The elements of intelligence and consciousness come together marvelously to produce different styles in predator and prey. Herbivores and carnivores develop different kinds of attention related to escaping or chasing. Although in both kinds of animal, arousal stimulates the production of adrenaline and norepinephrine by the adrenal glands, the effect in herbivores is primarily fear, whereas in carnivores the effect is primarily aggression. For both, arousal attunes the animal to what is ahead. Perhaps it does not experience forethought as we know it, but the animal does experience something like it. The predator is searchingly aggressive, innerdirected, tuned by the nervous system and the adrenal hormones, but aware in a sense closer to human consciousness than, say, a hungry lizard's instinctive snap at a passing beetle. Using past events as a framework, the large mammal predator is working out a relationship between movement and food, sensitive to possibilities in cold trails and distant sounds—and yesterday's unforgotten lessons. The herbivore prey is of a different mind. Its mood of wariness rather than searching and its attitude of general expectancy instead of anticipating are silk-thin veils of tranquility over an explosive endocrine system.

17. The author is primarily concerned with
    (A) disproving the view that herbivores are less intelligent than carnivores
    (B) describing a relationship between animals' intelligence and their ecological roles
    (C) establishing a direct link between early large mammals and their modern counterparts
    (D) analyzing the ecological basis for the dominance of some carnivores over other carnivores
    (E) demonstrating the importance of hormones in mental activity

18. The author refers to a hungry lizard (line 55) primarily in order to
    (A) demonstrate the similarity between the hunting methods of mammals and those of nonmammals
    (B) broaden the application of his argument by including an insectivore as an example
    (C) make a distinction between higher and lower levels of consciousness
    (D) provide an additional illustration of the brutality characteristic of predators
    (E) offer an objection to suggestions that all animals lack consciousness

GO ON TO THE NEXT PAGE.

19. It can be inferred from the passage that in animals less intelligent than the mammals discussed in the passage

(A) past experience is less helpful in ensuring survival
(B) attention is more highly focused
(C) muscular coordination is less highly developed
(D) there is less need for competition among species
(E) environment is more important in establishing the proper ratio of prey to predator

20. The sensitivity described in lines 56-61 is most clearly an example of

(A) "free-floating awareness" (lines 16-17)
(B) "flooding of impulses in the brain stem" (lines 29-30)
(C) "the holding of consistent images" (lines 31-32)
(D) "integration of details with perceived ends and purposes" (lines 37-38)
(E) "silk-thin veils of tranquility" (line 64)

21. The author's attitude toward the mammals discussed in the passage is best described as

(A) superior and condescending
(B) lighthearted and jocular
(C) apologetic and conciliatory
(D) wistful and tender
(E) respectful and admiring

22. The author provides information that would answer which of the following questions?

I. Why is an aroused herbivore usually fearful?
II. What are some of the degrees of attention in large mammals?
III. What occurs when the stimulus that causes arousal of a mammal is removed?

(A) I only (B) III only (C) I and II only (D) II and III only (E) I, II, and III

23. According to the passage, improvement in brain function among early large mammals resulted primarily from which of the following?

(A) Interplay of predator and prey
(B) Persistence of free-floating awareness in animals of the grasslands
(C) Gradual dominance of warm-blooded mammals over cold-blooded reptiles
(D) Interaction of early large mammals with less intelligent species
(E) Improvement of the capacity for memory among herbivores and carnivores

24. According to the passage, as the process of arousal in an organism continues, all of the following may occur EXCEPT

(A) the production of adrenaline
(B) the production of norepinephrine
(C) a heightening of sensitivity to stimuli
(D) an increase in selectivity with respect to stimuli
(E) an expansion of the range of states mediated by the brain stem

GO ON TO THE NEXT PAGE.

Tocqueville, apparently, was wrong. Jacksonian America was not a fluid, egalitarian society where individual wealth and poverty were ephemeral conditions. At least so argues E. Pessen in his iconoclastic study of the very rich in the United States between 1825 and 1850.

Pessen does present a quantity of examples, together with some refreshingly intelligible statistics, to establish the existence of an inordinately wealthy class. Though active in commerce or the professions, most of the wealthy were not self-made, but had inherited family fortunes. In no sense mercurial, these great fortunes survived the financial panics that destroyed lesser ones. Indeed, in several cities the wealthiest one percent constantly increased its share until by 1850 it owned half of the community's wealth. Although these observations are true, Pessen overestimates their importance by concluding from them that the undoubted progress toward inequality in the late eighteenth century continued in the Jacksonian period and that the United States was a class-ridden, plutocratic society even before industrialization.

25. According to the passage, Pessen indicates that all of the following were true of the very wealthy in the United States between 1825 and 1850 EXCEPT:

    (A) They formed a distinct upper class.
    (B) Many of them were able to increase their holdings.
    (C) Some of them worked as professionals or in business.
    (D) Most of them accumulated their own fortunes.
    (E) Many of them retained their wealth in spite of financial upheavals.

26. The author's attitude toward Pessen's presentation of statistics can be best described as

    (A) disapproving
    (B) shocked
    (C) suspicious
    (D) amused
    (E) laudatory

27. Which of the following best states the author's main point?

    (A) Pessen's study has overturned the previously established view of the social and economic structure of early nineteenth-century America.
    (B) Tocqueville's analysis of the United States in the Jacksonian era remains the definitive account of this period.
    (C) Pessen's study is valuable primarily because it shows the continuity of the social system in the United States throughout the nineteenth century.
    (D) The social patterns and political power of the extremely wealthy in the United States between 1825 and 1850 are well documented.
    (E) Pessen challenges a view of the social and economic system in the United States from 1825 to 1850, but he draws conclusions that are incorrect.

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Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. BOISTEROUS: (A) grateful (B) angry (C) clever (D) frightened (E) quiet

29. EMIT: (A) absorb (B) demand (C) mistake (D) prevent (E) require

30. METAMORPHOSE: (A) move ahead (B) remain unaltered (C) descend slowly (D) examine in haste (E) prepare in advance

31. ALLY: (A) mediator (B) felon (C) adversary (D) inventor (E) conspirator

32. OFFHAND:
(A) accurate
(B) universal
(C) appropriate
(D) premeditated
(E) disputatious

33. BROACH: (A) keep track of (B) lay claim to (C) close off (D) soothe (E) simplify

34. GIST: (A) artificial manner (B) trivial point (C) informal procedure (D) eccentric method (E) singular event

35. DIVESTITURE: (A) acquisition (B) promotion (C) subsidization (D) consultation (E) monopolization

36. EXTANT: (A) extensive (B) extraneous (C) extricable (D) extinct (E) extra

37. TRACTABILITY: (A) infertility (B) implausibility (C) incorrigibility (D) impenetrability (E) indefatigability

38. NOISOME:
(A) attractively fragrant
(B) subtly flattering
(C) consistently patient
(D) softly glowing
(E) gradually diminishing

SECTION 2

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-7

A mail-order company sells packages of jam, each containing three jars of jam. The available flavors are: grape, orange, strawberry, peach, and quince. Each jar contains exactly one flavor of jam. Each package must conform to the following rules:

Each package must contain either two or three different flavors of jam.

A package containing any orange jam must also contain at least one jar of grape.

A package containing any grape jam must also contain at least one jar of orange.

Peach jam and quince jam cannot be packed in the same package.

A package containing any strawberry jam must also contain at least one jar of quince, but a package containing quince jam need not contain strawberry jam.

1. Which of the following is an acceptable package?
   (A) One jar of peach, one jar of strawberry, and one jar of orange
   (B) One jar of orange, one jar of strawberry, and one jar of grape
   (C) Two jars of strawberry and one jar of quince
   (D) Three jars of peach
   (E) Three jars of orange

2. An acceptable package CANNOT contain which of the following combinations of jams?
   (A) Grape and peach
   (B) Peach and quince
   (C) Orange and peach
   (D) Orange and grape
   (E) Strawberry and quince

3. Which of the following could be packed with a jar of strawberry to make an acceptable package?
   (A) One jar of peach and one jar of orange
   (B) One jar of grape and one jar of orange
   (C) Two jars of quince
   (D) Two jars of orange
   (E) Two jars of grape

4. A jar of which of the following must be packed with a jar of orange and a jar of peach to make an acceptable package?
   (A) Grape
   (B) Orange
   (C) Strawberry
   (D) Peach
   (E) Quince

5. Which of the following pairs of jars of jam could be packed with a jar of orange to make an acceptable package?
   (A) One jar each of orange and strawberry
   (B) One jar each of grape and strawberry
   (C) Two jars of orange
   (D) Two jars of grape
   (E) Two jars of strawberry

6. Which of the following CANNOT be two of the three jars of jam in an acceptable package?
   (A) One jar of strawberry and one jar of peach
   (B) One jar of grape and one jar of orange
   (C) Two jars of orange
   (D) Two jars of grape
   (E) Two jars of strawberry

7. An acceptable package CANNOT contain two jars of
   (A) orange
   (B) grape
   (C) quince
   (D) strawberry
   (E) peach

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8. A person who agrees to serve as mediator between two warring factions at the request of both abandons by so agreeing the right later to take sides. To take sides at a later point would be to suggest that the earlier presumptive impartiality was a sham.

   The passage above emphasizes which of the following points about mediators?

   (A) They should try to form no opinions of their own about any issue that is related to the dispute.
   (B) They should not agree to serve unless they are committed to maintaining a stance of impartiality.
   (C) They should not agree to serve unless they are equally acceptable to all parties to a dispute.
   (D) They should feel free to take sides in the dispute right from the start, provided that they make their biases publicly known.
   (E) They should reserve the right to abandon their impartiality so as not to be open to the charge of having been deceitful.

9. A study of attitudes toward prime-time television programs showed that programs with identical ratings in terms of number of people watching received highly divergent marks for quality from their viewers. This additional piece of information could prove valuable for advertisers, who might be well advised to spend their advertising dollars for programs that viewers feel are of high quality.

   Which of the following, if true, supports the claim that information about viewers' perceptions of the quality of television programs could be valuable to advertisers?

   (A) The number of programs judged to be of high quality constituted a high percentage of the total number of programs judged.
   (B) Many of the programs judged to be of high quality were shown on noncommercial networks.
   (C) Television viewers more frequently remember the sponsors of programs they admire than the sponsors of programs they judge mediocre.
   (D) Television viewers tend to watch new programs only when those programs follow old, familiar programs.
   (E) Television viewers report that the quality of a television advertisement has little effect on their buying habits.

10. Nineteenth-century art critics judged art by the realism of its method of representation. It was assumed that the realistic method developed from primitive beginnings to the perfection of formal realism. It is one of the permanent gains of the aesthetic revolution of the twentieth century that we are rid of this type of aesthetics.

    It can be inferred from the passage above that the artistic revolution of the twentieth century had which of the following effects?

    (A) It deemphasized realistic representation as an evaluative consideration for judging works of art.
    (B) It permitted modern critics to appreciate the simplicity of primitive art.
    (C) It repudiated the realistic representation found in the art of the past.
    (D) It reinforced traditional ways of looking at and judging great art.
    (E) It allowed art critics to understand the evolution and nature of art.

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Questions 11-16

Three women—R, S, and T, two men—U and V, and four children—W, X, Y, and Z—are going to a game. They have a total of nine seats for the game, but the seats are in three different sections of the arena; they have a group of three adjacent seats in each section. For the game, the nine people must divide into groups of three according to the following restrictions:

No adults of the same sex can be together in any group.
W cannot be in R's group.
X must be in a group with S or U or both.

11. If R is the only adult in one group, the other members of her group must be

(A) W and X
(B) W and Y
(C) X and Y
(D) X and Z
(E) Y and Z

12. If R and U are two of the three people in the first group, who can be in the second and third groups, respectively?

(A) S, T, W ; V, Y, Z
(B) S, W, Z ; T, V, X
(C) S, X, Y ; T, W, Z
(D) T, V, W; S, Y, Z
(E) W, X, Y ; S, V, Z

13. Which of the following pairs of people can be in the same group as W ?

(A) R and Y
(B) S and U
(C) S and V
(D) U and V
(E) X and Z

14. Which of the following must be true?

(A) One of the women is in a group with two children.
(B) One of the two men is in a group with W.
(C) R is in a group with a man.
(D) T's group includes exactly one child.
(E) One of the groups includes no children.

15. Any of the following pairs of people could be in X's group EXCEPT

(A) R and U
(B) S and T
(C) S and U
(D) S and W
(E) T and U

16. If T, Y, and Z are in one group, which of the following must be together in one of the other groups?

(A) R, S, V
(B) R, U, W
(C) S, U, W
(D) S, V, W
(E) U, V, X

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Questions 17-22

The manager of a repertory theater company is planning a schedule of productions for the company's five-week summer festival. Two different plays will be scheduled for each of the five weeks. The ten plays that will be scheduled are four plays by playwright R, two plays by playwright S, two plays by playwright T, one play by playwright U, and one play by playwright V. The scheduling is subject to the following restrictions:

No two plays by the same playwright will be scheduled for any of the five weeks, except for week 3, for which two plays by playwright R will be scheduled.

The play by playwright V will be scheduled for week 5.

No play by playwright S will be scheduled for the same week as any play by playwright R.

17. Which of the following could be the two plays scheduled for week 1?

(A) Two plays by playwright R
(B) Two plays by playwright S
(C) A play by playwright R and a play by playwright S
(D) A play by playwright R and the play by playwright U
(E) The play by playwright U and the play by playwright V

18. If the plays by playwright R will be scheduled for weeks 2, 3, and 4, which of the following must be true?

(A) A play by playwright S will be scheduled for week 2.
(B) A play by playwright S will be scheduled for week 5.
(C) A play by playwright T will be scheduled for week 2.
(D) A play by playwright T will be scheduled for week 4.
(E) The play by playwright U will be scheduled for week 1.

19. If the plays by playwright S will be scheduled for weeks 1 and 2, which of the following must be true?

(A) A play by playwright R will be scheduled for week 4.
(B) A play by playwright T will be scheduled for week 1.
(C) A play by playwright T will be scheduled for week 4.
(D) A play by playwright T will be scheduled for week 5.
(E) The play by playwright U will be scheduled for week 4.

20. Which of the following pairs of plays CANNOT be scheduled together for any week?

(A) A play by playwright R and a play by playwright T
(B) A play by playwright R and the play by playwright U
(C) A play by playwright S and a play by playwright T
(D) A play by playwright S and the play by playwright U
(E) A play by playwright T and the play by playwright U

21. If a play by playwright S and the play by playwright U will both be scheduled for the same week, which of the following must be true?

(A) A play by playwright R and a play by playwright T will both be scheduled for the same week.
(B) A play by playwright S and a play by playwright T will both be scheduled for the same week.
(C) The play by playwright U will be scheduled for week 2.
(D) A play by playwright S will be scheduled for week 4.
(E) A play by playwright T will be scheduled for week 5.

22. If the plays by playwright T will be scheduled for consecutive weeks, which of the following must be true?

(A) The plays by playwright S will be scheduled for weeks 1 and 2.
(B) The plays by playwright S will be scheduled for weeks 2 and 5.
(C) The plays by playwright S will be scheduled for weeks 4 and 5.
(D) The plays by playwright T will be scheduled for weeks 1 and 2.
(E) The plays by playwright T will be scheduled for weeks 4 and 5.

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Questions 23-24

Why save endangered species? For the general public, endangered species appear to be little more than biological oddities. A very different perception is gained from considering the issue of extinction in a wider context. The important point is that many major social advances have been made on the basis of life forms whose worth would never have been perceived in advance. Consider the impact of rubber-producing plants on contemporary life and industry: approximately two-thirds of the world's rubber supply comes from rubber-producing plants and is made into objects as diverse as rubber washers and rubber boots.

23. The author's point is made chiefly by
    (A) acknowledging the validity of two opposing points of view
    (B) appealing to the emotions of the audience rather than to their intellects
    (C) suggesting a useful perspective for viewing the question raised at the beginning of the passage
    (D) trying to discredit the view of an opponent without presenting an alternative hypothesis
    (E) generalizing from similar to dissimilar cases

24. All of the following facts could be used as illustrative examples in addition to the example of rubber-producing plants EXCEPT:
    (A) The discovery of the vaccine for smallpox resulted from observing the effect of the cowpox virus on the hands of dairy workers.
    (B) The major source of our pharmaceutical supplies is plants, some of them commonly thought of as weeds.
    (C) Certain antibiotics were originally derived from mold growing on cantaloupe.
    (D) Plastic is a unique product derived from petroleum and petroleum by-products.
    (E) Hamsters and other rodents have played an important role in laboratory tests of medicine for use on humans.

25. In the United States between 1850 and 1880, the number of farmers continued to increase, but at a rate lower than that of the general population.

    Which of the following statements directly contradicts the information presented above?
    (A) The number of farmers in the general population increased slightly in the thirty years between 1850 and 1880.
    (B) The rate of growth of the United States labor force and the rate of growth of the general population rose simultaneously in the thirty years between 1850 and 1880.
    (C) The proportion of farmers in the United States labor force remained constant in the thirty years between 1850 and 1880.
    (D) The proportion of farmers in the United States labor force decreased from 64 percent in 1850 to 49 percent in 1880.
    (E) The proportion of farmers in the general population increased from 68 percent in 1850 to 72 percent in 1880.

SECTION 3

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

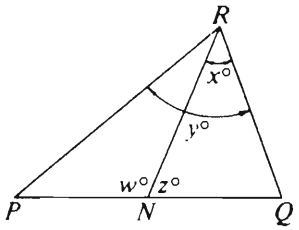
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	(40% of 50) + 60	(60% of 50) + 40
2.	$\frac{1}{12}$ of 17	$\frac{1}{17}$ of 12
	$x + y = -1$	
3.	x	y
4.	23(784)	24(783)
	$0 < r < t$	
5.	$\frac{r}{t}$	$\frac{t}{r}$

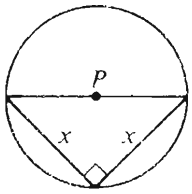
6.	x	35

	Column A	Column B
	For each home in Town X, the amount of property tax is p percent of the value of the home. The property tax on a home whose value is \$45,000 is \$1,200.	
7.	The property tax on a home in Town X whose value is \$54,000	\$1,300
	The area of square region S is 36.	
8.	The perimeter of S	24
	A printer numbered consecutively the pages of a book, beginning with 1 on the first page. In numbering the pages, he printed a total of 189 digits.	
9.	The number of pages in the book	100
	The average (arithmetic mean) of x, y, and 6 is 3.	
10.	$\frac{x+y}{2}$	$\frac{3}{2}$

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

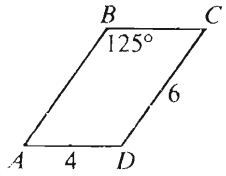
	Column A	Column B
	Triangular regions T_1 and T_2 have equal areas and have heights h_1 and h_2, respectively.	
11.	The area of T_1 / h_1	The area of T_2 / h_2
12.	$\frac{3 \cdot 3 \cdot 3}{6 \cdot 6 \cdot 6}$	$\left(\frac{1}{2}\right)^3$



The area of the circular region with center P is 16π.

13.	x	4

	Column A	Column B
	m, p, and x are positive integers and $mp = x$.	
14.	m	x



$ABCD$ is a parallelogram.

15.	The area of region $ABCD$	24

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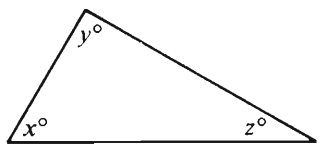
Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. When walking, a certain person takes 16 complete steps in 10 seconds. At this rate, how many complete steps does the person take in 72 seconds?

(A) 45
(B) 78
(C) 86
(D) 99
(E) 115



17. In the figure above, what is the value of $\frac{x+y+z}{45}$?

(A) 2 (B) 3 (C) 4 (D) 5 (E) 6

18. $52.68 \times \frac{1}{100} =$

(A) 0.05268 (B) 0.5268 (C) 5.268
(D) 526.8 (E) 52,680

19. If $b - c = 3$, and $a + c = 32$, then $a + b =$

(A) 30 (B) 35 (C) 40 (D) 42 (E) 50

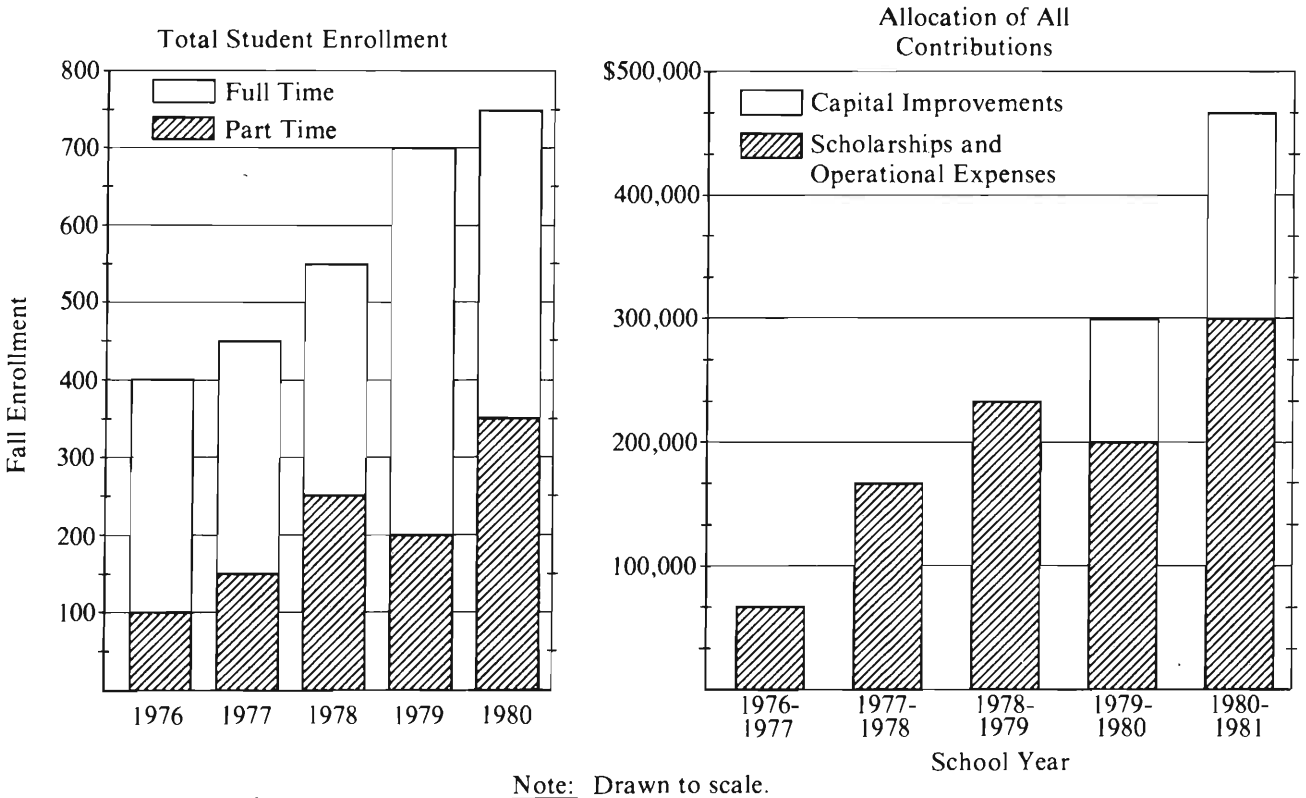
20. A rectangular floor 18 feet by 10 feet is to be completely covered with carpeting that costs x dollars per square yard. In terms of x, how many dollars will the carpeting cost? (1 yard = 3 feet)

(A) $20x$
(B) $28x$
(C) $60x$
(D) $180x$
(E) $540x$

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graphs.

COLLEGE *R*: ENROLLMENT AND CONTRIBUTIONS
1976-1980



Note: Drawn to scale.

21. What was the total number of students enrolled at College *R* in the fall of 1979 ?

(A) 200
(B) 250
(C) 500
(D) 650
(E) 700

22. By what percent did the number of part-time students enrolled increase from the fall of 1979 to the fall of 1980 ?

(A) 7%
(B) 42%
(C) $66\frac{2}{3}\%$
(D) 75%
(E) 80%

GO ON TO THE NEXT PAGE.

23. What was the increase, if any, in the number of full-time students enrolled at College R from the fall of 1976 to the fall of 1977 ?

(A) 0 (B) 50 (C) 100
(D) 150 (E) 200

24. In the 1978-1979 school year, if 12 percent of the amount of contributions allocated to scholarships and operational expenses was allocated to heating costs, approximately how much was NOT allocated to heating costs?

(A) \$2,000
(B) \$25,000
(C) \$176,000
(D) \$205,000
(E) \$250,000

25. Approximately what was the total amount of contributions to College R from the 1978-1979 school year through the 1980-1981 school year, inclusive?

(A) \$967,000
(B) \$1,000,000
(C) \$9,000,000
(D) \$9,667,000
(E) \$10,000,000

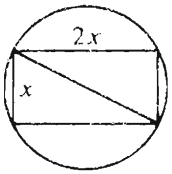
---

26. If $x \neq 0$, then $\frac{x(x^2)^3}{x^2} =$

(A) x^2 (B) x^3 (C) x^4 (D) x^5 (E) x^6

27. Seven is equal to how many thirds of seven?

(A) $\frac{1}{3}$
(B) 1
(C) 3
(D) 7
(E) 21



28. In the figure above, if the area of the inscribed rectangular region is 32, then the circumference of the circle is

(A) 20π (B) $4\pi\sqrt{5}$ (C) $4\pi\sqrt{3}$
(D) $2\pi\sqrt{5}$ (E) $2\pi\sqrt{3}$

29. Which of the following equals the reciprocal of $x - \frac{1}{y}$, where $x - \frac{1}{y} \neq 0$?

(A) $\frac{1}{x} - y$

(B) $-\frac{y}{x}$

(C) $\frac{y}{x-1}$

(D) $\frac{x}{xy-1}$

(E) $\frac{y}{xy-1}$

30. A certain integer n is a multiple of both 5 and 9. Which of the following must be true?

I. n is an odd integer.
II. n is equal to 45.
III. n is a multiple of 15.

(A) III only
(B) I and II only
(C) I and III only
(D) II and III only
(E) I, II, and III

SECTION 4

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. The ------- of mass literacy coincided with the first industrial revolution; in turn, the new expansion in literacy, as well as cheaper printing, helped to nurture the ------- of popular literature.

   (A) building..mistrust
   (B) reappearance..display
   (C) receipt..source
   (D) selection..influence
   (E) emergence..rise

2. Although ancient tools were ------- preserved, enough have survived to allow us to demonstrate an occasionally interrupted but generally ------- progress through prehistory.

   (A) partially..noticeable
   (B) superficially..necessary
   (C) unwittingly..documented
   (D) rarely..continual
   (E) needlessly..incessant

3. In parts of the Arctic, the land grades into the landfast ice so ------- that you can walk off the coast and not know you are over the hidden sea.

   (A) permanently (B) imperceptibly
   (C) irregularly (D) precariously
   (E) slightly

4. Kagan maintains that an infant's reactions to its first stressful experiences are part of a natural process of development, not harbingers of childhood unhappiness or ------- signs of adolescent anxiety.

   (A) prophetic (B) normal
   (C) monotonous (D) virtual
   (E) typical

5. An investigation that is ------- can occasionally yield new facts, even notable ones, but typically the appearance of such facts is the result of a search in a definite direction.

   (A) timely (B) unguided (C) consistent
   (D) uncomplicated (E) subjective

6. Like many eighteenth-century scholars who lived by cultivating those in power, Winckelmann neglected to neutralize, by some ------- gesture of comradeship, the resentment his peers were bound to feel because of his ------- the high and mighty.

   (A) quixotic..intrigue with
   (B) enigmatic..familiarity with
   (C) propitiatory..involvement with
   (D) salutary..questioning of
   (E) unfeigned..sympathy for

7. In a ------- society that worships efficiency, it is difficult for a sensitive and idealistic person to make the kinds of ------- decisions that alone spell success as it is defined by such a society.

   (A) bureaucratic..edifying
   (B) pragmatic..hardheaded
   (C) rational..well-intentioned
   (D) competitive..evenhanded
   (E) modern..dysfunctional

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. TABLECLOTH:TABLE :: (A) tent:ground
(B) shirt:hanger (C) window:sill
(D) sheet:mattress (E) cloud:earth

9. CANVAS:PAINTER :: (A) leather:shoe
(B) brush:palette (C) chisel:wood
(D) marble:sculptor (E) hammer:carpenter

10. MANSION:RESIDENCE ::
(A) limousine:automobile
(B) chandelier:candle
(C) tuxedo:wardrobe
(D) diamond:rhinestone
(E) yacht:harbor

11. DOOR:ROOM :: (A) rudder:anchor
(B) boat:ship (C) patio:terrace
(D) hatch:hold (E) basement:attic

12. CHOREOGRAPHY:DANCE ::
(A) ceremony:sermon
(B) agenda:advertisement
(C) poetry:recitation
(D) instrumentation:conductor
(E) plot:story

13. EVAPORATE:VAPOR ::
(A) petrify:stone (B) centrifuge:liquid
(C) saturate:fluid (D) corrode:acid
(E) incinerate:fire

14. ASSUAGE:SORROW ::
(A) retaliate:antipathy
(B) dampen:ardor
(C) entrust:reliability
(D) counsel:reluctance
(E) withhold:appreciation

15. NUMB:INSENSIBLE :: (A) reflect:luminous
(B) burnish:lustrous (C) heckle:raucous
(D) repulse:odious (E) braid:sinuous

16. AUDACIOUS:TREPIDATION ::
(A) refractory:intransigence
(B) laconic:volubility
(C) sordid:aspiration
(D) cursory:accumulation
(E) derisive:subordination

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

"I want to criticize the social system, and to show it at work, at its most intense." Virginia Woolf's provocative statement about her intentions in writing *Mrs. Dalloway* has regularly been ignored by the critics, since it highlights an aspect of her literary interests very different from the traditional picture of the "poetic" novelist concerned with examining states of reverie and vision and with following the intricate pathways of individual consciousness. But Virginia Woolf was a realistic as well as a poetic novelist, a satirist and social critic as well as a visionary: literary critics' cavalier dismissal of Woolf's social vision will not withstand scrutiny.

In her novels, Woolf is deeply engaged by the questions of how individuals are shaped (or deformed) by their social environments, how historical forces impinge on people's lives, how class, wealth, and gender help to determine people's fates. Most of her novels are rooted in a realistically rendered social setting and in a precise historical time.

Woolf's focus on society has not been generally recognized because of her intense antipathy to propaganda in art. The pictures of reformers in her novels are usually satiric or sharply critical. Even when Woolf is fundamentally sympathetic to their causes, she portrays people anxious to reform their society and possessed of a message or program as arrogant or dishonest, unaware of how their political ideas serve their own psychological needs (Her *Writer's Diary* notes: "the only honest people are the artists," whereas "these social reformers and philanthropists . . . harbor . . . discreditable desires under the disguise of loving their kind. . . .") Woolf detested what she called "preaching" in fiction, too, and criticized novelist D. H. Lawrence (among others) for working by this method.

Woolf's own social criticism is expressed in the language of observation rather than in direct commentary, since for her, fiction is a contemplative, not an active art. She describes phenomena and provides materials for a judgment about society and social issues; it is the reader's work to put the observations together and understand the coherent point of view behind them. As a moralist, Woolf works by indirection, subtly undermining officially accepted mores, mocking, suggesting, calling into question, rather than asserting, advocating, bearing witness: hers is the satirist's art.

Woolf's literary models were acute social observers like Chekhov and Chaucer. As she put it in *The Common Reader*, "It is safe to say that not a single law has been framed or one stone set upon another because of anything Chaucer said or wrote; and yet, as we read him, we are absorbing morality at every pore." Like Chaucer, Woolf chose to understand as well as to judge, to know her society root and branch—a decision crucial in order to produce art rather than polemic.

17. Which of the following would be the most appropriate title for the passage?

(A) Poetry and Satire as Influences on the Novels of Virginia Woolf
(B) Virginia Woolf: Critic and Commentator on the Twentieth-Century Novel
(C) Trends in Contemporary Reform Movements as a Key to Understanding Virginia Woolf's Novels
(D) Society as Allegory for the Individual in the Novels of Virginia Woolf
(E) Virginia Woolf's Novels: Critical Reflections on the Individual and on Society

18. In the first paragraph of the passage, the author's attitude toward the literary critics mentioned can best be described as

(A) disparaging
(B) ironic
(C) facetious
(D) skeptical but resigned
(E) disappointed but hopeful

19. It can be inferred from the passage that Woolf chose Chaucer as a literary model because she believed that

(A) Chaucer was the first English author to focus on society as a whole as well as on individual characters
(B) Chaucer was an honest and forthright author, whereas novelists like D. H. Lawrence did not sincerely wish to change society
(C) Chaucer was more concerned with understanding his society than with calling its accepted mores into question
(D) Chaucer's writing was greatly, if subtly, effective in influencing the moral attitudes of his readers
(E) her own novels would be more widely read if, like Chaucer, she did not overtly and vehemently criticize contemporary society

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20. It can be inferred from the passage that the most probable reason Woolf realistically described the social setting in the majority of her novels was that she

(A) was aware that contemporary literary critics considered the novel to be the most realistic of literary genres
(B) was interested in the effect of a person's social milieu on his or her character and actions
(C) needed to be as attentive to detail as possible in her novels in order to support the arguments she advanced in them
(D) wanted to show that a painstaking fidelity in the representation of reality did not in any way hamper the artist
(E) wished to prevent critics from charging that her novels were written in an ambiguous and inexact style

21. Which of the following phrases best expresses the sense of the word "contemplative" as it is used in lines 43-44 of the passage?

(A) Gradually elucidating the rational structures underlying accepted mores
(B) Reflecting on issues in society without prejudice or emotional commitment
(C) Avoiding the aggressive assertion of the author's perspective to the exclusion of the reader's judgment
(D) Conveying a broad view of society as a whole rather than focusing on an isolated individual consciousness
(E) Appreciating the world as the artist sees it rather than judging it in moral terms

22. The author implies that a major element of the satirist's art is the satirist's

(A) consistent adherence to a position of lofty disdain when viewing the foibles of humanity
(B) insistence on the helplessness of individuals against the social forces that seek to determine an individual's fate
(C) cynical disbelief that visionaries can either enlighten or improve their societies
(D) fundamental assumption that some ambiguity must remain in a work of art in order for it to reflect society and social mores accurately
(E) refusal to indulge in polemic when presenting social mores to readers for their scrutiny

23. The passage supplies information for answering which of the following questions?

(A) Have literary critics ignored the social criticism inherent in the works of Chekhov and Chaucer?
(B) Does the author believe that Woolf is solely an introspective and visionary novelist?
(C) What are the social causes with which Woolf shows herself to be sympathetic in her writings?
(D) Was D. H. Lawrence as concerned as Woolf was with creating realistic settings for his novels?
(E) Does Woolf attribute more power to social environment or to historical forces as shapers of a person's life?

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It is a popular misconception that nuclear fusion power is free of radioactivity; in fact, the deuterium-tritium reaction that nuclear scientists are currently exploring with such zeal produces both alpha particles and neutrons. (The neutrons are used to produce tritium from a lithium blanket surrounding the reactor.) Another common misconception is that nuclear fusion power is a virtually unlimited source of energy because of the enormous quantity of deuterium in the sea. Actually, its limits are set by the amount of available lithium, which is about as plentiful as uranium in the Earth's crust. Research should certainly continue on controlled nuclear fusion, but no energy program should be premised on its existence until it has proven practical. For the immediate future, we must continue to use hydroelectric power, nuclear fission, and fossil fuels to meet our energy needs. The energy sources already in major use are in major use for good reason.

24. The primary purpose of the passage is to
    (A) criticize scientists who believe that the deuterium-tritium fusion reaction can be made feasible as an energy source
    (B) admonish scientists who have failed to correctly calculate the amount of lithium available for use in nuclear fusion reactors
    (C) defend the continued short-term use of fossil fuels as a major energy source
    (D) caution against uncritical embrace of nuclear fusion power as a major energy source
    (E) correct the misconception that nuclear fusion power is entirely free of radioactivity

25. It can be inferred from the passage that the author believes which of the following about the current state of public awareness concerning nuclear fusion power?
    (A) The public has been deliberately misinformed about the advantages and disadvantages of nuclear fusion power.
    (B) The public is unaware of the principal advantage of nuclear fusion over nuclear fission as an energy source.
    (C) The public's awareness of the scientific facts concerning nuclear fusion power is somewhat distorted and incomplete.
    (D) The public is not interested in increasing its awareness of the advantages and disadvantages of nuclear fusion power.
    (E) The public is aware of the disadvantages of nuclear fusion power but not of its advantages.

26. The passage provides information that would answer which of the following questions?
    (A) What is likely to be the principal source of deuterium for nuclear fusion power?
    (B) How much incidental radiation is produced in the deuterium-tritium fusion reaction?
    (C) Why are scientists exploring the deuterium-tritium fusion reaction with such zeal?
    (D) Why must the tritium for nuclear fusion be synthesized from lithium?
    (E) Why does the deuterium-tritium reaction yield both alpha particles and neutrons?

27. Which of the following statements concerning nuclear scientists is most directly suggested in the passage?
    (A) Nuclear scientists are not themselves aware of all of the facts surrounding the deuterium-tritium fusion reaction.
    (B) Nuclear scientists exploring the deuterium-tritium reaction have overlooked key facts in their eagerness to prove nuclear fusion practical.
    (C) Nuclear scientists may have overestimated the amount of lithium actually available in the Earth's crust.
    (D) Nuclear scientists have not been entirely dispassionate in their investigation of the deuterium-tritium reaction.
    (E) Nuclear scientists have insufficiently investigated the lithium-to-tritium reaction in nuclear fusion.

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. PERSEVERE: (A) put into (B) send out (C) take away (D) give up (E) bring forward

29. WATERPROOF: (A) soggy (B) natural (C) unglazed (D) viscous (E) permeable

30. AMALGAMATE: (A) separate (B) fixate (C) terminate (D) calibrate (E) correlate

31. PUNGENCY: (A) boredom (B) redundancy (C) unresponsiveness (D) blandness (E) insignificance

32. ANARCHY: (A) courtesy (B) hope (C) order (D) neutrality (E) importance

33. INCURSION: (A) loss of respect (B) lack of resolve (C) reparation (D) relapse (E) retreat

34. ABROGATE: (A) uphold (B) defer (C) discuss secretly (D) admit willingly (E) read thoroughly

35. HAPLESS: (A) excited (B) elated (C) fortunate (D) completely self-reliant (E) assured of success

36. AVER: (A) collect (B) augment (C) placate (D) deny (E) encourage

37. SEDULOUS: (A) presumptuous (B) ponderous (C) treacherous (D) careless (E) useless

38. INSULARITY:
(A) overzealousness
(B) cosmopolitanism
(C) susceptibility
(D) willing hospitality
(E) knowledgeable consideration

SECTION 5
Time—30 minutes
25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-6

The consumer complaint department of a firm employs exactly six people who answer letters: G, H, I, J, K, and L. Every complaint letter received by the department is classified as either red or blue. The following procedures for answering the letters are used:

Red letters are given first to G or H.
Blue letters are given first to any one of the following: G, J, or I.

If a letter raises a problem that cannot be resolved by the person to whom it is given, it must be forwarded until it reaches someone who can resolve the problem and answer the letter. A letter must be forwarded as follows:

By G to I if the letter is red, but to J if the letter is blue;
By H to either G or I;
By I to J if the letter is red, but to K if the letter is blue;
By J to either I or K whether the letter is red or blue;
By K to L whether the letter is red or blue;
L answers every letter given to him.

1. Any of the following can be true EXCEPT:

(A) G forwards a red letter to I.
(B) H forwards a red letter to G.
(C) H forwards a red letter to I.
(D) I forwards a red letter to K.
(E) J forwards a red letter to I.

2. A blue letter could reach L via which of the following sequences of people?

(A) G to H to K
(B) G to I to J
(C) G to J to K
(D) I to H to J
(E) I to G to J to K

3. Any letter that reaches L must have been previously given to

(A) G (B) H (C) I (D) J (E) K

4. Which of the following could be given to each of the six members of the consumer complaint department in turn?

(A) A red letter that is first given to H
(B) A red letter that is first given to G
(C) A blue letter that is first given to G
(D) A blue letter that is first given to I
(E) A blue letter that is first given to J

5. Any letter that reaches L must have been given to a minimum of how many members of the consumer complaint department before reaching L ?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

6. If a member of the consumer complaint department is given a letter that he or she had previously given to some other member of the department, the person who is given the letter a second time could be

(A) G (B) H (C) J (D) K (E) L

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7. Veteran screenwriters, aiming at creating a 120-page screenplay for a film, usually turn in a 135-page first draft. As one screenwriter put it, "That gives those in charge of the movie a chance to be creative when they get the script: at the very least, they can cut 15 pages."

   The screenwriter's statement cited above conveys which of the following propositions?

   (A) Screenwriters for a film are generally not involved in any aspects of filmmaking besides providing the script.
   (B) Seasoned screenwriters are resigned to, and make allowance for, draft scripts being altered by those evaluating them.
   (C) Truly creative screenwriters are too temperamental to adhere to page limits set for their work.
   (D) It takes a special kind of creativity to recognize what is best left out of a film script.
   (E) Even experienced screenwriters cannot be expected to write scripts of consistently high quality throughout.

8. During the day in Lake Constance, the zooplankton *D. hyalina* departs for the depths where food is scarce and the water cold. *D. galeata* remains near the warm surface where food is abundant. Even though *D. galeata* grows and reproduces much faster, its population is often outnumbered by *D. hyalina*.

   Which of the following, if true, would help resolve the apparent paradox presented above?

   (A) The number of species of zooplankton living at the bottom of the lake is twice that of species living at the surface.
   (B) Predators of zooplankton, such as whitefish and perch, live and feed near the surface of the lake during the day.
   (C) In order to make the most of scarce food resources, *D. hyalina* matures more slowly than *D. galeata*.
   (D) *D. galeata* clusters under vegetation during the hottest part of the day to avoid the sun's rays.
   (E) *D. galeata* produces twice as many offspring per individual in any given period of time as does *D. hyalina*.

9. Each year, fires in the United States cause $12 billion in property losses, insurance costs, fire-fighting expenses, and loss of worker productivity. These fire losses are seven times those of Japan on a per capita basis.

   Which of the following, if true, would be LEAST likely to be a factor contributing to the difference between fire losses in Japan and those in the United States?

   (A) The walls of Japanese homes are made mostly of wood and bamboo and are more combustible than the walls in most American homes.
   (B) The rate of arson, a major contributor to fire statistics in the United States, is almost negligible in Japan.
   (C) Most Japanese homes, unlike those in the United States, are equipped with specially designed and effective fire-extinguishing equipment.
   (D) Foam-based and plastic furniture, less popular in Japan than in the United States, ignites readily and releases twice the heat energy of equivalent weights of natural fibers.
   (E) Japanese fire departments devote proportionately more personnel time to inspection, training, and public education than do United States fire departments.

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Questions 10-13

At a cooking school, the following six classes--F, G, H, J, K, and L--are to be scheduled to meet for one demonstration each during an all-day seminar. Each demonstration is 45 minutes long, and the only possible starting times for the class meetings are 9 a.m., 10 a.m., 11 a.m., 2 p.m., and 4 p.m. The schedule of class meetings is to be established in accordance with the following conditions:

F cannot meet at the same time that G meets.
H must meet earlier in the day than F.
J must meet in the afternoon.
None of the other classes can meet at the time that K meets.
L can meet in the morning or in the afternoon.

10. Any of the following could meet at 4 p.m. EXCEPT

(A) F (B) G (C) H (D) J (E) K

11. If J meets some time before K meets, which of the following could be true?

(A) F meets some time after J meets.
(B) G meets at 4 p.m.
(C) K meets at 2 p.m.
(D) L meets at 2 p.m.
(E) L meets some time after K meets.

12. If F meets at 10 a.m. and none of the classes meets at 4 p.m., which of the following must be true?

(A) H meets some time before L meets.
(B) H meets some time before K meets.
(C) K meets some time before G meets.
(D) L meets at the same time that G meets.
(E) L meets at the same time that J meets.

13. If H meets at 2 p.m., which of the following must be true?

(A) F meets later in the day than L.
(B) G meets at 2 p.m.
(C) G meets in the morning.
(D) J meets at 2 p.m.
(E) K meets in the morning.

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Questions 14-18

Exactly seven persons—P, Q, R, S, T, U, and V—participate in and finish all of a series of swimming races. There are no ties for any position at the finish of any of the races.

V always finishes somewhere ahead of P.
P always finishes somewhere ahead of Q.
Either R finishes first and T finishes last, or S finishes first and U or Q finishes last.

14. If in a race V finishes fifth, which of the following must be true?

(A) S finishes first.
(B) R finishes second.
(C) T finishes third.
(D) Q finishes fourth.
(E) U finishes last.

15. If in a race R finishes first, V can finish no lower than

(A) second
(B) third
(C) fourth
(D) fifth
(E) sixth

16. If in a race S finishes second, which of the following can be true?

(A) P finishes before R.
(B) V finishes before S.
(C) P finishes before V.
(D) T finishes before Q.
(E) U finishes before V.

17. If in a race S finishes sixth and Q finishes fifth, which of the following can be true?

(A) V finishes first or fourth.
(B) R finishes second or third.
(C) P finishes second or fifth.
(D) U finishes third or fourth.
(E) T finishes fourth or fifth.

18. If in a race R finishes second and Q finishes fifth, which of the following must be true?

(A) S finishes third.
(B) P finishes third.
(C) V finishes fourth.
(D) T finishes sixth.
(E) U finishes sixth.

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Questions 19-22

The membership of two committees, designated X and Y, must be drawn exclusively from a group of seven people: Frederick, Georgia, Helen, Irene, Jorge, Karin, and Lamont.

Each of the seven people must serve on X or Y.
No one can serve on both X and Y.
Frederick cannot serve on a committee with Georgia or with Jorge.
Helen cannot serve on a committee with Irene.

19. If Helen serves on X, which of the following must be true?

(A) Frederick serves on X.
(B) Georgia serves on Y.
(C) Irene serves on Y.
(D) Karin serves on X.
(E) Lamont serves on Y.

20. If exactly two people serve on X, which of the following can be one of the two?

(A) Georgia
(B) Helen
(C) Jorge
(D) Karin
(E) Lamont

21. If Lamont does not serve with Karin or Irene, which of the following CANNOT be true?

(A) Frederick serves with Irene.
(B) Georgia serves with Helen.
(C) Helen serves with Karin.
(D) Irene serves with Karin.
(E) Jorge serves with Lamont.

22. There would be only one possible distribution of people on the committees if which of the following restrictions were added to the original set of conditions?

(A) Frederick and Lamont must serve on X, and Helen must serve on Y.
(B) Jorge must serve on X, and Karin and Lamont must serve on Y.
(C) Georgia and Lamont must serve on X.
(D) Helen and four other people must serve on X.
(E) Irene and three other people must serve on Y.

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23. Many researchers believe that the presence of RNA in brain cells is the biochemical basis of memory; that is, the presence of RNA enables us to remember. Because certain chemicals are known to inhibit the synthesis of RNA in the body, we can test this hypothesis. Animals that have learned particular responses can be injected with an RNA inhibitor and then tested for memory of the learned responses.

Which of the following test results would most seriously weaken the case for RNA as the basis of memory?

(A) After an injection of RNA inhibitor, a wide range of behaviors in addition to the learned responses were affected.
(B) After an injection of RNA inhibitor, animals that had not consistently been giving the learned responses were able to give them consistently.
(C) After injections of RNA inhibitor, some animals lost memory of the learned responses totally but others lost it only partially.
(D) After a small injection of RNA inhibitor, animals responded well, but as the size of the injection increased, they gave fewer of the learned responses.
(E) After an injection of RNA inhibitor, animals could not learn a new response.

24. The greatest chance for the existence of extra-terrestrial life is on a planet beyond our solar system. The Milky Way galaxy alone contains 100 billion other suns, many of which could be accompanied by planets similar enough to Earth to make them suitable abodes of life.

The statement above assumes which of the following?

(A) Living creatures on another planet would probably have the same appearance as those on Earth.
(B) Life cannot exist on other planets in our solar system.
(C) If the appropriate physical conditions exist, life is an inevitable consequence.
(D) More than one of the suns in the galaxy is accompanied by an Earth-like planet.
(E) It is likely that life on another planet would require conditions similar to those on Earth.

25. A ten-year comparison between the United States and the Soviet Union in terms of crop yields per acre revealed that when only planted acreage is compared, Soviet yields are equal to 68 percent of United States yields. When total agricultural acreage (planted acreage plus fallow acreage) is compared, however, Soviet yield is 114 percent of United States yield.

From the information above, which of the following can be most reliably inferred about United States and Soviet agriculture during the ten-year period?

(A) A higher percentage of total agricultural acreage was fallow in the United States than in the Soviet Union.
(B) The United States had more fallow acreage than planted acreage.
(C) Fewer total acres of available agricultural land were fallow in the Soviet Union than in the United States.
(D) The Soviet Union had more planted acreage than fallow acreage.
(E) The Soviet Union produced a greater volume of crops than the United States produced.

SECTION 6

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

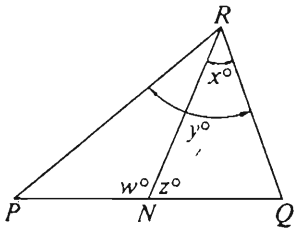
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



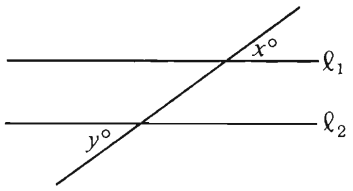
Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	$k + n = 13$ $n + 3 = 8$	
1.	k	n

Betty spent \$75 for a bicycle and she also spent \$27 repairing it. She then sold it for \$120.

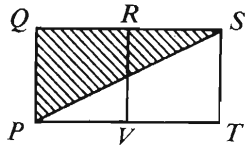
2.	The money Betty received in excess of the total amount she spent	\$20



$\ell_1 \parallel \ell_2$

3.	x	y
4.	$-2(-3)(-4)$	$0(4)(8)$

	Column A	Column B
5.	10	$11 + x$
6.	$\frac{1}{2} + \frac{3}{5}$	$\frac{1+3}{2+5}$



Squares $PQRV$ and $VRST$ have sides of length 6.

7.	The area of shaded region PQS	36

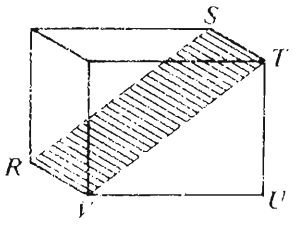
R, S, and T are 3 consecutive odd integers and $R < S < T$.

8.	$R + S + 1$	$S + T - 1$

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Column A	Column B

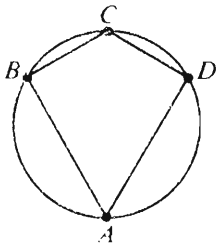


In the rectangular solid shown, $TU = 3$, $UV = 4$, and $VR = 2$.

9.	The area of the shaded rectangular region	9

$x^2y > 0$
$xy^2 < 0$

10.	x	y



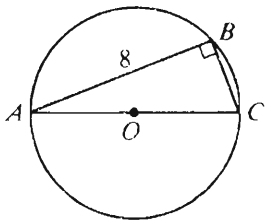
The diameter of the circle is 10.

11.	The area of the region enclosed by quadrilateral $ABCD$	40

12.	$2\frac{1}{2}$ percent of 1,120	$2^2 \cdot 7$

Working at constant rates, machine R completely presses x records in 0.5 hour and machine S completely presses x records in 0.75 hour ($x > 0$).

13.	The number of records completely pressed by R in 3 hours	The number of records completely pressed by S in 4 hours



The circle with center O has a radius of 5.

14.	The perimeter of $\triangle ABC$	24

x, y, and z are negative integers.

15.	The product of x, y, and z	The sum of x, y, and z

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

---

16. $\sqrt{(42-6)(25+11)}$

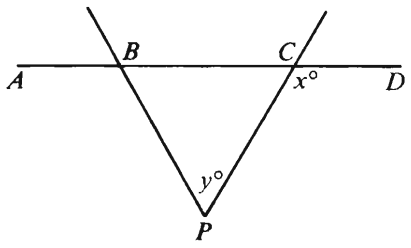
(A) 6 (B) 18 (C) 36
(D) 120 (E) 1,296

17. The price per pair of brand X socks is \$2 and the price per pair of brand Y socks is \$3. If there is no sales tax and a customer chooses only from among these two brands, what is the greatest number of pairs of socks that he can buy with exactly \$25 ?

(A) 9
(B) 10
(C) 11
(D) 12
(E) 20

18. What is the remainder when 6^3 is divided by 8 ?

(A) 5
(B) 3
(C) 2
(D) 1
(E) 0



19. In the figure above, $BP = CP$. If $x = 120$, then $y =$

(A) 30 (B) 60 (C) 75 (D) 90 (E) 120

20. If $y = 3x$ and $z = 2y$, then in terms of x, $x + y + z =$

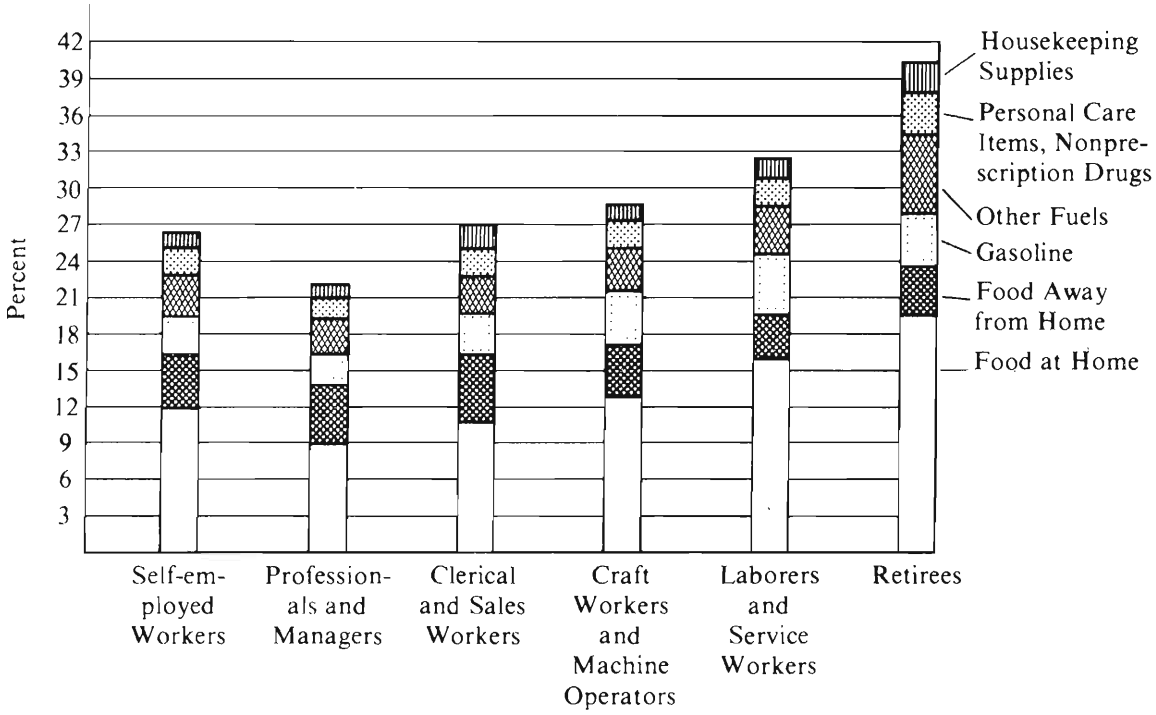
(A) $10x$ (B) $9x$ (C) $8x$
(D) $6x$ (E) $5x$

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following data.

EXPENDITURES ON FOOD AND SELECTED NONFOOD ITEMS, 1973

Percent of Average Annual Income (before taxes) Spent by Families on Food and Selected Nonfood Items



Note: Drawn to scale.

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Average Weekly Food and Household Expenditures

Occupational Category of Family Head	Percent of Food and Household Expenditures						Average Weekly Food and Household Expenditures
	Food at Home			Food Away from Home	Personal Care Items, Nonprescription Drugs	House-keeping Supplies	
	Meats, Poultry, Seafood	Cereals, Bakery and Dairy Products, Fruits and Vegetables	Other Food at Home				
Self-employed Workers	22	25	14	22	10	7	$35.88
Professionals and Managers	19	23	11	29	11	7	$38.77
Clerical and Sales Workers	21	22	11	28	11	7	$32.07
Craft Workers and Machine Operators	23	25	15	21	9	7	$35.44
Laborers and Service Workers	24	27	14	19	9	7	$28.86
Retirees	23	29	14	16	11	7	$19.83

21. For which of the following categories was the percent of the average annual income (before taxes) spent on food at home the least?

(A) Self-employed workers
(B) Professionals and managers
(C) Clerical and sales workers
(D) Craft workers and machine operators
(E) Laborers and service workers

22. Approximately what average amount per week did the families of professionals and managers spend on food away from home?

(A) $2
(B) $8
(C) $11
(D) $29
(E) $38

23. Approximately what percent of the average weekly food and household expenditures of clerical and sales workers was spent on fruits and vegetables?

(A) 4% (B) 7% (C) 22% (D) 25%
(E) It cannot be determined from the information given.

24. Approximately what percent of the total average annual income (before taxes) of retirees was spent on meats, poultry, and seafood (consumed at home)?

(A) 7% (B) 10% (C) 20%
(D) 23% (E) 31%

25. Which of the following statements can be inferred from the information given?

I. Of the categories shown, retirees had the greatest average annual incomes (before taxes).
II. For all the categories shown, the average amount spent per week on housekeeping supplies was the same.
III. Of the categories shown, the average amount spent per week on meats, poultry, and seafood (consumed at home) was greatest for craft workers and machine operators.

(A) I only (B) II only (C) III only
(D) I and II (E) II and III

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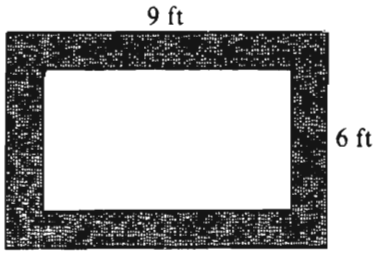


26. The rectangular rug shown in the figure above has a floral border 1 foot wide on all sides. What is the area, in square feet, of that portion of the rug that excludes the border?

(A) 28
(B) 40
(C) 45
(D) 48
(E) 53

27. If $\frac{d-3n}{7n-d} = 1$, which of the following must be true about the relationship between d and n?

(A) n is 4 more than d.

(B) d is 4 more than n.

(C) n is $\frac{7}{3}$ of d.

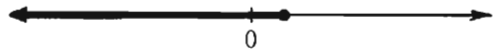
(D) d is 5 times n.

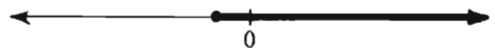
(E) d is 2 times n.

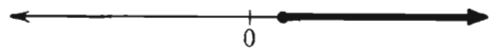
28. How many positive whole numbers less than 81 are NOT equal to squares of whole numbers?

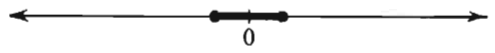
(A) 9 (B) 70 (C) 71 (D) 72 (E) 73

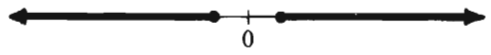
29. Of the following, which could be the graph of $2-5x \leqq \frac{6x-5}{-3}$?

(A) 

(B) 

(C) 

(D) 

(E) 

$$A = \frac{\pi d^2}{x}$$

30. If the formula above gives the area A of a circular region in terms of its diameter d, then $x =$

(A) $\frac{1}{4}$ (B) $\frac{1}{2}$ (C) 1 (D) 2 (E) 4

FOR GENERAL TEST 18 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 1			Section 4		
Number	Answer	P+	Number	Answer	P+
1	C	87	1	E	88
2	E	86	2	D	80
3	A	66	3	B	79
4	E	61	4	A	69
5	B	52	5	B	69
6	D	44	6	C	51
7	D	18	7	B	41
8	B	91	8	D	94
9	E	76	9	D	87
10	D	50	10	A	81
11	C	51	11	D	70
12	A	38	12	E	59
13	E	41	13	A	42
14	C	38	14	B	37
15	A	27	15	B	22
16	C	14	16	B	30
17	B	83	17	E	66
18	C	79	18	A	50
19	A	54	19	D	54
20	D	55	20	B	71
21	E	78	21	C	40
22	C	60	22	E	38
23	A	75	23	B	42
24	E	52	24	D	70
25	D	76	25	C	84
26	E	29	26	A	51
27	E	60	27	D	19
28	E	86	28	D	86
29	A	78	29	E	84
30	B	81	30	A	80
31	C	77	31	D	71
32	D	66	32	C	67
33	C	51	33	E	44
34	B	55	34	A	39
35	A	42	35	C	38
36	D	34	36	D	29
37	C	26	37	D	28
38	A	24	38	B	20

QUANTITATIVE ABILITY					
Section 3			Section 6		
Number	Answer	P+	Number	Answer	P+
1	A	87	1	A	91
2	A	87	2	B	94
3	D	82	3	C	93
4	B	83	4	B	87
5	B	84	5	D	86
6	C	82	6	A	85
7	A	72	7	C	75
8	C	74	8	B	70
9	B	59	9	A	77
10	C	44	10	B	51
11	D	59	11	D	53
12	C	64	12	C	59
13	A	47	13	A	61
14	D	42	14	C	55
15	B	27	15	D	41
16	E	89	16	C	87
17	C	84	17	D	81
18	B	87	18	E	86
19	B	79	19	B	86
20	A	42	20	A	71
21	E	93	21	B	85
22	D	62	22	C	56
23	A	60	23	E	59
24	D	58	24	A	21
25	B	46	25	C	26
26	D	50	26	A	62
27	C	40	27	D	45
28	B	39	28	D	32
29	E	33	29	C	32
30	A	27	30	E	34

ANALYTICAL ABILITY					
Section 2			Section 5		
Number	Answer	P+	Number	Answer	P+
1	C	81	1	D	85
2	B	93	2	C	79
3	C	89	3	E	84
4	A	96	4	A	60
5	D	89	5	B	43
6	A	82	6	C	51
7	E	48	7	B	77
8	B	76	8	B	67
9	C	71	9	A	63
10	A	58	10	C	72
11	E	89	11	D	45
12	D	39	12	B	45
13	C	65	13	E	35
14	A	58	14	A	63
15	B	71	15	C	53
16	D	60	16	E	45
17	D	72	17	D	48
18	B	56	18	D	43
19	A	52	19	C	76
20	E	24	20	B	52
21	A	32	21	C	42
22	D	27	22	D	24
23	C	67	23	B	50
24	D	39	24	E	47
25	E	21	25	A	22

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 18 ONLY AND THE PERCENTS BELOW*

Raw Score	Scaled Scores and Percents Below						Raw Score	Scaled Scores and Percents Below					
	Verbal	%	Quantitative	%	Analytical	%		Verbal	%	Quantitative	%	Analytical	%
74-76	800	99					35	400	29	500	38	600	76
73	790	99					34	390	27	480	32	580	70
72	780	99					33	380	25	470	31	570	68
71	770	99					32	370	22	460	28	550	62
70	750	98					31	360	20	440	24	540	60
69	740	98					30	360	20	430	22	520	54
68	730	97					29	350	18	420	20	510	51
67	720	96					28	340	16	400	17	490	46
66	700	95					27	330	14	390	15	480	43
65	690	94					26	320	12	380	13	460	37
64	680	93					25	310	11	370	12	450	34
63	670	92					24	300	10	350	9	430	29
62	660	91					23	290	8	340	8	420	26
61	650	89					22	280	7	330	7	400	21
60	640	88	800	99			21	280	7	310	5	390	19
59	620	85	800	99			20	270	5	300	5	370	15
58	610	83	790	99			19	260	4	290	4	360	13
57	600	81	780	98			18	250	4	280	3	340	9
56	590	80	770	97			17	240	3	260	2	330	8
55	580	78	750	94			16	230	2	250	2	310	6
54	570	76	740	92			15	220	1	240	1	300	4
53	560	73	730	91			14	210	1	220	1	280	3
52	550	71	710	87			13	200	0	210	1	270	2
51	540	68	700	85			12	200		200	0	250	1
50	530	65	690	83	800	99	11	200		200		240	1
49	520	63	680	81	800	99	10	200		200		220	0
48	510	60	660	77	790	99	9	200		200		210	0
47	500	57	650	74	780	98	0-8	200		200		200	0
46	490	55	640	73	760	97							
45	480	52	620	67	750	97							
44	470	49	610	65	730	95							
43	460	46	600	64	720	94							
42	450	43	590	61	700	92							
41	450	43	570	55	690	91							
40	440	40	560	53	670	88							
39	430	37	550	51	660	86							
38	420	35	530	45	640	83							
37	410	32	520	43	630	81							
36	400	29	510	41	610	78							

*Percent scoring below the given scaled score, based on the performance of the 785,276 examinees who took the General Test between October 1, 1981, and September 30, 1984.

TEST 19

SECTION 1

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Because they had expected the spacecraft Voyager 2 to be able to gather data only about the planets Jupiter and Saturn, scientists were ------- the wealth of information it sent back from Neptune twelve years after leaving Earth.

   (A) disappointed in
   (B) concerned about
   (C) confident in
   (D) elated by
   (E) anxious for

2. Wearing the latest fashions was exclusively the ------- of the wealthy until the 1850's, when mass production, aggressive entrepreneurs, and the availability of the sewing machine made them ------- the middle class.

   (A) aspiration. .disagreeable to
   (B) vexation. .superfluous for
   (C) bane. .profitable to
   (D) prerogative. .accessible to
   (E) obligation. .popular with

3. Linguists have now confirmed what experienced users of ASL—American Sign Language—have always implicitly known: ASL is a grammatically ------- language in that it is capable of expressing every possible syntactic relation.

   (A) limited
   (B) economical
   (C) complete
   (D) shifting
   (E) abstract

4. He was regarded by his followers as something of -------, not only because of his insistence on strict discipline, but also because of his ------- adherence to formal details.

   (A) a martinet. .rigid
   (B) an authority. .sporadic
   (C) a tyrant. .reluctant
   (D) a fraud. .conscientious
   (E) an acolyte. .maniacal

5. The influence of the *Timaeus* among early philosophical thinkers was -------, if only because it was the sole dialogue ------- in Europe for almost 1,000 years.

   (A) pervasive. .available
   (B) inestimable. .suppressed
   (C) unnoteworthy. .abridged
   (D) underestimated. .studied
   (E) circumscribed. .translated

6. The Gibsons were little given to ------- in any form; not one of them was afraid of -------, of being and seeming unlike their neighbors.

   (A) humility. .absurdity
   (B) excellence. .mediocrity
   (C) anger. .confrontation
   (D) conformism. .singularity
   (E) ostentation. .eccentricity

7. Even after ------- against the ------- of popular sovereignty were included, major figures in the humanistic disciplines remained skeptical about the proposal to extend suffrage to the masses.

   (A) recommendations. .continuation
   (B) safeguards. .excesses
   (C) arguments. .introduction
   (D) provisions. .advantages
   (E) laws. .creation

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. FILING : METAL ::
   (A) jamb : door
   (B) sand : concrete
   (C) yeast : bread
   (D) shaving : wood
   (E) ashes : coal

9. HOST : PARASITE ::
   (A) meadow : soil
   (B) egg : bird
   (C) medium : bacterium
   (D) lair : predator
   (E) kernel : seed

10. SOLILOQUY : PLAY ::
    (A) violin : concerto
    (B) overture : musical
    (C) duet : ensemble
    (D) lyric : poem
    (E) aria : opera

11. MEETING : MINUTES ::
    (A) concert : orchestration
    (B) filter : camera
    (C) sale : deed
    (D) earthquake : vibration
    (E) television : signal

12. CONTRACT : IMPLODE ::
    (A) expand : swell
    (B) descend : plummet
    (C) add : accelerate
    (D) cool : solidify
    (E) stretch : flex

13. APPRISE : INFORMATION ::
    (A) admonish : warning
    (B) defend : doubt
    (C) criticize : justification
    (D) comprehend : benefits
    (E) unite : whole

14. MINUTIAE : DETAILS ::
    (A) data : hypotheses
    (B) research : findings
    (C) approximations : calculations
    (D) queries : answers
    (E) quibbles : objections

15. FRENETIC : MOVEMENT ::
    (A) perceptive : analysis
    (B) effortless : expression
    (C) focused : thought
    (D) spontaneous : behavior
    (E) fanatical : belief

16. VENOM : TOXIN ::
    (A) bile : liver
    (B) vitamin : mineral
    (C) insulin : sugar
    (D) milk : nutrient
    (E) clot : blood

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Isadora Duncan's masterly writings on the dance reveal the depth of her determination to create a lyric form of the art which was free of characterization, storytelling, and the theatrical exhibition of skills. She wished to discard the traditional methods and established vocabularies of such dance forms as ballet and to explore the internal sources of human expressiveness. She shunned bodily ornamentation and strove to use only the natural movements of her body, undistorted by acrobatic exaggeration and stimulated only by internal compulsion. In her recitals Duncan danced to the music of Beethoven, Wagner, and Gluck, among others, but, contrary to popular belief, she made no attempt to visualize or to interpret the music; rather, she simply relied on it to provide the inspiration for expressing inner feelings through movement. She did not regard this use of music as ideal, however, believing that she would someday dispense with music entirely. That day never came.

17. The author is primarily concerned with Duncan's
    (A) masterful lyricism as expressed in her writings on the dance
    (B) concerted efforts to subdue the natural movements of the dance
    (C) belated recognition that she could not actually fulfill all of her ideals for the dance
    (D) basic standards for the dance form that she wished to create and perform
    (E) continuous responsiveness to a popular misconception about the nature of her new art form

18. The author implies that Duncan relied on music in her recitals in order to
    (A) interpret musical works solely by means of natural body movements
    (B) foster the illusion that music serves as an inspiration for the dance
    (C) inspire the expression of inner feeling when she danced
    (D) validate the public belief that music inspires the expression of feeling through movement
    (E) counter the public belief that she made no attempt to visualize music

19. According to the passage, Duncan intended to develop an art form that would do all of the following EXCEPT
    (A) avoid the use of standard ballet techniques
    (B) revitalize an earlier established vocabulary
    (C) draw on internal sources of human expressiveness
    (D) create intended effects without the use of acrobatic exaggeration
    (E) derive inspiration solely from inner feelings

20. It can be inferred from the passage that which of the following endeavors is LEAST compatible with Duncan's ideals for the dance?
    (A) Using music to stimulate the inspiration to dance
    (B) Attempting to free an art form of both characterization and storytelling
    (C) Minimizing the theatrical exhibition of skills
    (D) Being inspired to express inner feeling through movement
    (E) Creating a lyric art form by drawing on inner personal resources

GO ON TO THE NEXT PAGE.

The recent, apparently successful, prediction by mathematical models of an appearance of El Niño—the warm ocean current that periodically develops along the Pacific coast of South America—has excited researchers. Jacob Bjérknes pointed out over 20 years ago how winds might create either abnormally warm or abnormally cold water in the eastern equatorial Pacific. Nonetheless, until the development of the models no one could explain why conditions should regularly shift from one to the other, as happens in the periodic oscillations between appearances of the warm El Niño and the cold so-called anti-El Niño. The answer, at least if the current model that links the behavior of the ocean to that of the atmosphere is correct, is to be found in the ocean.

It has long been known that during an El Niño, two conditions exist: (1) unusually warm water extends along the eastern Pacific, principally along the coasts of Ecuador and Peru, and (2) winds blow from the west into the warmer air rising over the warm water in the east. These winds tend to create a feedback mechanism by driving the warmer surface water into a "pile" that blocks the normal upwelling of deeper, cold water in the east and further warms the eastern water, thus strengthening the wind still more. The contribution of the model is to show that the winds of an El Niño, which raise sea level in the east, simultaneously send a signal to the west lowering sea level. According to the model, that signal is generated as a negative Rossby wave, a wave of depressed, or negative, sea level, that moves westward parallel to the equator at 25 to 85 kilometers per day. Taking months to traverse the Pacific, Rossby waves march to the western boundary of the Pacific basin, which is modeled as a smooth wall but in reality consists of quite irregular island chains, such as the Philippines and Indonesia.

When the waves meet the western boundary, they are reflected, and the model predicts that Rossby waves will be broken into numerous coastal Kelvin waves carrying the same negative sea-level signal. These eventually shoot toward the equator, and then head eastward along the equator propelled by the rotation of the Earth at a speed of about 250 kilometers per day. When enough Kelvin waves of sufficient amplitude arrive from the western Pacific, their negative sea-level signal overcomes the feedback mechanism tending to raise the sea level, and they begin to drive the system into the opposite cold mode. This produces a gradual shift in winds, one that will eventually send positive sea-level Rossby waves westward, waves that will eventually return as cold cycle-ending positive Kelvin waves, beginning another warming cycle.

21. The primary function of the passage as a whole is to

(A) introduce a new explanation of a physical phenomenon
(B) explain the difference between two related physical phenomena
(C) illustrate the limitations of applying mathematics to complicated physical phenomena
(D) indicate the direction that research into a particular physical phenomenon should take
(E) clarify the differences between an old explanation of a physical phenomenon and a new model of it

22. Which of the following best describes the organization of the first paragraph?

(A) A theory is presented and criticized.
(B) A model is described and evaluated.
(C) A result is reported and its importance explained.
(D) A phenomenon is noted and its significance debated.
(E) A hypothesis is introduced and contrary evidence presented.

23. According to the passage, which of the following features is characteristic of an El Niño?

(A) Cold coastal water near Peru
(B) Winds blowing from the west
(C) Random occurrence
(D) Worldwide effects
(E) Short duration

GO ON TO THE NEXT PAGE.

24. According to the model presented in the passage, which of the following normally signals the disappearance of an El Niño?

(A) The arrival in the eastern Pacific of negative sea-level Kelvin waves
(B) A shift in the direction of the winds produced by the start of an anti-El Niño elsewhere in the Pacific
(C) The reflection of Kelvin waves after they reach the eastern boundary of the Pacific, along Ecuador and Peru
(D) An increase in the speed at which negative Rossby waves cross the Pacific
(E) The creation of a reservoir of colder, deep ocean water trapped under the pile of warmer, surface ocean water

25. It can be inferred from the passage that which of the following would result fairly immediately from the cessation of the winds of an El Niño?

I. Negative Rossby waves would cease to be generated in the eastern Pacific.
II. The sea level in the eastern Pacific would fall.
III. The surface water in the eastern Pacific would again be cooled by being mixed with deep water.

(A) I only
(B) II only
(C) I and II only
(D) I and III only
(E) I, II, and III

26. Which of the following, if true, would most seriously undermine the validity of the model of El Niño that is presented in the passage?

(A) During some years El Niño extends significantly farther along the coasts of Ecuador and Peru than during other years.
(B) During periods of unusually cool temperatures along the eastern Pacific, an El Niño is much colder than normal.
(C) The normal upwelling of cold water in the eastern Pacific depends much more on the local characteristics of the ocean than on atmospheric conditions.
(D) The variations in the time it takes Rossby waves to cross the Pacific depend on the power of the winds that the waves encounter.
(E) The western boundary of the Pacific basin is so irregular that it impedes most coastal Kelvin waves from heading eastward.

27. The passage best supports the conclusion that during an anti-El Niño the fastest-moving signal waves are

(A) negative Rossby waves moving east along the equator
(B) positive Rossby waves moving west along the equator
(C) negative Kelvin waves moving west along the equator
(D) positive Kelvin waves moving west along the equator
(E) positive Kelvin waves moving east along the equator

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. REPULSION: (A) combination (B) elongation (C) attraction (D) oscillation (E) illumination

29. ANALOGOUS: (A) resolving inconsistency (B) lacking similarity (C) repetitive (D) unremarkable (E) prudent

30. CESSATION: (A) involvement (B) union (C) commencement (D) invigoration (E) protection

31. SPLENDOR: (A) earnestness (B) squalor (C) depravity (D) greed (E) innovation

32. DERIDE: (A) emulate (B) reward (C) condone (D) show respect for (E) extend favor to

33. SPARSE: (A) mild (B) bent (C) vile (D) keen (E) rife

34. TIRADE: (A) lecture (B) digression (C) unplanned debate (D) modest request (E) dispassionate speech

35. DIFFIDENT: (A) wise (B) bold (C) cruel (D) relaxed (E) sloppy

36. SENTIENT: (A) abnormal (B) irregular (C) unconscious (D) irrelevant (E) elemental

37. ATTENUATE: (A) lighten (B) loosen (C) worsen (D) shorten (E) strengthen

38. SURFEIT: (A) famish (B) assuage (C) restrain (D) regulate (E) maintain

SECTION 2

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

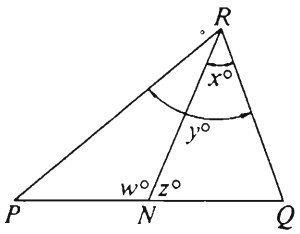
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

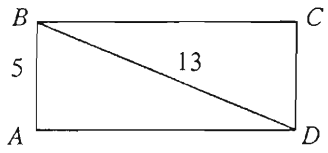
	Column A	Column B
1.	$\frac{2+1}{2+3}$	$\frac{1}{3}$

A spraying machine uses 6 full 5-gallon buckets of fungicide every 20 minutes.

	Column A	Column B
2.	The number of gallons of fungicide the machine uses during 8 hours of spraying	720

For a temperature of x degrees Fahrenheit, the equivalent temperature in degrees Celsius is $\frac{5}{9}(x - 32)$.

	Column A	Column B
3.	The temperature in degrees Celsius that is equivalent to 270 degrees Fahrenheit	140



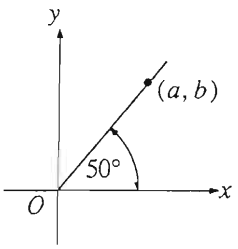
$ABCD$ is a rectangle.

	Column A	Column B
4.	The area of region $ABCD$	50

$2x + y = 5$
$3x - y = 10$

	Column A	Column B
5.	x	2

	Column A	Column B
6.	$\frac{34}{0.339}$	100



	Column A	Column B
7.	a	b

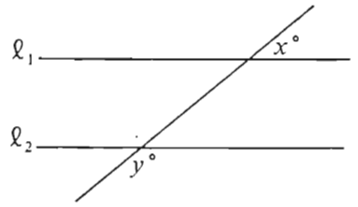
$x \neq 0$

	Column A	Column B
8.	$-x$	$-2x$

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B



ℓ_1 is not parallel to ℓ_2.

9.	$x + y$	180

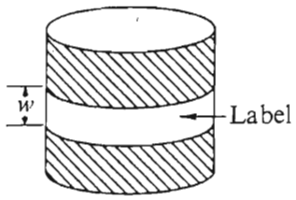
x and y are consecutive odd integers.

10.	$3(x - y)^4$	48

Points P, R, and T lie on a straight line. The distance from P to R is 21, and the distance from P to T is 9.

11.	The distance from R to T	16

	Column A	Column B



A rectangular label is attached to a right circular cylinder with radius r. The label, which encircles the cylinder without overlap, has width w and an area equal to the area of the base of the cylinder.

12.	w	r

k is a positive integer.

13.	$\frac{1}{2^k}$	$\frac{1}{3^k} + \frac{1}{3^k}$

$yz > 0$
$xy < 0$

14.	xz	0

$n = 2^4 \cdot 5^6$
k is an integer.
10^k is a factor of n.

15.	The greatest possible value of 10^k	10,000

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Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. Which of the following equations can be used to find the value of x if 8 more than $9x$ is 3 times the sum of 6 and x?

(A) $9x + 8 = 3x + 6$
(B) $8 + 9x = 3(x - 6)$
(C) $9x + 8 = 3(x + 6)$
(D) $3(8 + 9x) = 6x$
(E) $9x + 8 = 3 + 6 + x$

17. 42 is what percent of 70?

(A) 57%
(B) 60%
(C) 67%
(D) 70%
(E) 167%

18. Which of the following is equivalent to $\frac{2}{\frac{1}{2^3}}$?

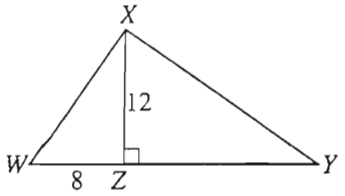
(A) 2^4

(B) 2^2

(C) $\frac{1}{2}$

(D) $\frac{1}{2^2}$

(E) $\frac{1}{2^4}$



19. In the figure above, if the area of $\triangle XYZ$ is 60, then $WY =$

(A) 5
(B) 10
(C) 12
(D) 13
(E) 18

20. Ground oats, wheat bran, linseed meal, and ground barley are mixed by weight in the ratio of 10 : 6 : 2 : 2, respectively. How many tons of wheat bran are there in 15 tons of the mixture?

(A) $1\frac{1}{2}$

(B) $2\frac{1}{2}$

(C) 3

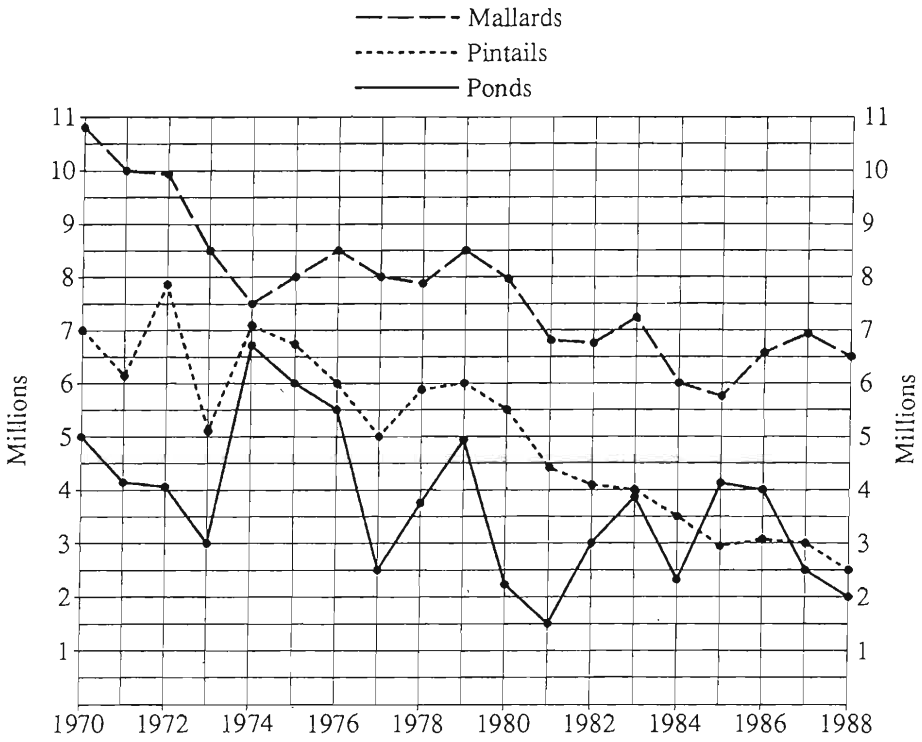
(D) $4\frac{1}{2}$

(E) $7\frac{1}{2}$

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graph.

THE NUMBER OF PONDS AND THE POPULATIONS
OF TWO SPECIES OF DUCKS (MALLARDS AND PINTAILS)
IN A REGION OF NORTH AMERICA: 1970 – 1988



Note: Drawn to scale.

GO ON TO THE NEXT PAGE.

21. By approximately how many million did the mallard population decrease from 1970 to 1988 ?

(A) 0.6
(B) 2.8
(C) 3.6
(D) 4.3
(E) 7.0

22. In 1984 the population of pintails was approximately what fraction of the mallard population?

(A) $\frac{5}{7}$

(B) $\frac{7}{12}$

(C) $\frac{1}{3}$

(D) $\frac{1}{4}$

(E) $\frac{3}{20}$

23. What was the approximate percent increase in the number of ponds from 1973 to 1974 ?

(A) 80%
(B) 125%
(C) 175%
(D) 200%
(E) 375%

24. During which of the following periods was the percent decrease in the mallard population closest to 25 percent?

(A) 1970 to 1973
(B) 1972 to 1973
(C) 1974 to 1986
(D) 1980 to 1984
(E) 1984 to 1985

25. For any pair of successive years between 1977 and 1982, inclusive, the increase or decrease in the number of ponds was between

(A) 0.7 and 2.8 million
(B) 1.0 and 3.0 million
(C) 1.5 and 5.3 million
(D) 2.5 and 4.8 million
(E) 4.1 and 5.3 million

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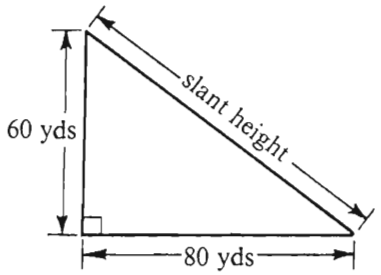
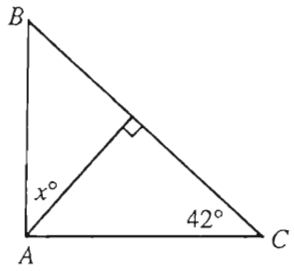


26. The figure above shows a cross section of a grandstand that seats 1,000 people per 2 yards of slant height. What is the total number of seats in the grandstand?

(A) 25,000
(B) 35,000
(C) 40,000
(D) 50,000
(E) 100,000

27. Which of the following is equivalent to $x^2 < x$?

(A) $0 < x < 1$
(B) $-1 < x < 1$
(C) $x < 0$
(D) $x < 1$
(E) $x > 1$



28. In the figure above, if $\angle CAB$ is a right angle, then $x =$

(A) 38
(B) 40
(C) 42
(D) 45
(E) 48

29. Of the positive integers that are multiples of 30 and are less than or equal to 360, what fraction are multiples of 12?

(A) $\frac{1}{6}$
(B) $\frac{1}{5}$
(C) $\frac{1}{3}$
(D) $\frac{2}{5}$
(E) $\frac{1}{2}$

30. If x is an integer and $x^2 < 37$, what is the greatest possible value of x minus the least possible value of x?

(A) 5
(B) 6
(C) 10
(D) 12
(E) 36

SECTION 3

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-6

The recipe for Hearty Noodle Soup calls for six ingredients—noodles, onions, potatoes, rosemary, sage, and tomatoes—to be added one at a time into a potful of water. The ingredients must be added according to the following directions:

The sage is added fourth.
The onions are added immediately before the tomatoes are added.
The noodles are added sometime before the sage is added and sometime before the rosemary is added.
The potatoes are added sometime before the rosemary is added.

1. Which of the following is an acceptable order, from first to last, in which the ingredients could be added?
   (A) Noodles, onions, tomatoes, sage, potatoes, rosemary
   (B) Noodles, potatoes, rosemary, sage, tomatoes, onions
   (C) Noodles, rosemary, potatoes, sage, onions, tomatoes
   (D) Potatoes, onions, tomatoes, sage, noodles, rosemary
   (E) Potatoes, onions, tomatoes, noodles, sage, rosemary

2. If the potatoes are added fifth, which of the following must be true?
   (A) The noodles are added first.
   (B) The noodles are added second.
   (C) The onions are added first.
   (D) The rosemary is added sixth.
   (E) The tomatoes are added third.

3. If the tomatoes are added sixth, which of the following can be true?
   (A) The noodles are added third.
   (B) The onions are added second.
   (C) The potatoes are added first.
   (D) The potatoes are added fifth.
   (E) The rosemary is added second.

4. If the noodles are added third, which of the following must be true?
   (A) The potatoes are added first.
   (B) The potatoes are added second.
   (C) The rosemary is added fifth.
   (D) The tomatoes are added second.
   (E) The tomatoes are added sixth.

5. If the onions are added sometime before the sage is added, which of the following must be true?
   (A) The noodles are added first.
   (B) The noodles are added third.
   (C) The potatoes are added third.
   (D) The potatoes are added fifth.
   (E) The tomatoes are added second.

6. Which of the following is a complete and accurate list of the ingredients any one of which could be the first ingredient added?
   (A) Noodles, potatoes
   (B) Noodles, tomatoes
   (C) Onions, rosemary
   (D) Noodles, onions, potatoes
   (E) Noodles, potatoes, tomatoes

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7. The use of the term "neat" as a general term of approval is an unfortunate development in colloquial English. The original meaning of "neat" is "tidy." Therefore, the use of "neat" as a general term of approval is incorrect and should be discouraged.

   Which of the following is an assumption that, if accepted, allows the conclusion above to be properly drawn?

   (A) The original meaning of an English word is the only correct meaning to use.
   (B) The term "neat" has been in the English language for many centuries.
   (C) The use of "neat" as a general term of approval is a recent innovation in English.
   (D) Speakers of colloquial English are not obligated to speak correctly.
   (E) The term "neat" has changed its meaning only once in the history of English.

8. The price of maple syrup has jumped from 22 dollars a gallon three years ago to 40 dollars a gallon today. It can be concluded that maple-syrup harvesters have been artificially inflating prices and that governmental price regulations are necessary to control rising prices.

   Which of the following, if true, casts the most doubt on the conclusion drawn above?

   (A) The government already requires maple-syrup harvesters to submit their facilities to licensing by the health department.
   (B) Insect infestation and drought have stunted the growth of syrup-producing maple trees and caused less-abundant syrup harvests.
   (C) Maple syrup is produced in rural areas that suffer from high unemployment.
   (D) Technological improvements in maple-syrup harvesting have reduced production costs.
   (E) Maple-syrup prices have risen many times in the past, though never before at the rate recently observed.

9. In 1988 unemployment in some regions of the United States dropped to the lowest rate in ten years, while the rate in other regions reached an all-time high. In 1978 similar conditions led to large migrations of workers from regions with high unemployment to regions with low unemployment. There was, however, significantly less such migration in 1988.

   Which of the following, if true about 1988, would contribute most to explaining why there was less migration of workers in 1988 ?

   (A) The regions with the lowest unemployment rates had many of the same kinds of industries as those in the regions with high unemployment, but this was not the case in 1978.
   (B) In contrast to 1978, the regions with the lowest unemployment rates had the largest number of new jobs, although substantially fewer of the new jobs required retraining.
   (C) In contrast to 1978, housing costs in the areas with the lowest unemployment rates were substantially higher than housing costs in other parts of the country.
   (D) The unemployment rate in countries outside of the United States was higher than it was ten years before.
   (E) Unemployment benefits in the regions of high unemployment were slightly lower than they were ten years earlier in regions of high unemployment.

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Questions 10-15

Two nations, Fontan and Gordia, have agreed to submit any disputes that might arise between them to arbitration panels drawn from a pool of arbitrators. The pool consists of the following: three Fontanian representatives—K, L, and M; three Gordian representatives—P, Q, and R; and three neutral arbitrators—S, T, and U. Each arbitration panel must be formed according to the following conditions:

A panel can have three, four, five, or six members.
At least one member of each panel must be neutral.
Neither Fontanian nor Gordian representatives can make up more than half the number of members on a panel.
S cannot be on a panel with L, with M, or with U.
R cannot be on a panel with L or with T.

10. Which of the following is a properly constituted panel?

(A) K, L, P, R, T
(B) L, M, P, Q
(C) M, P, S, T
(D) P, Q, R, U
(E) P, Q, S, T

11. If both S and T are to be members of a three-member panel, then which of the following can be the third member of that panel?

(A) L
(B) M
(C) P
(D) R
(E) U

12. If R and S are both selected as members of a four-member panel, which of the following must also be selected as a member of that panel?

(A) K
(B) L
(C) P
(D) Q
(E) U

13. If K, M, Q, and R are all selected as members of a five-member panel, which of the following must be selected as the fifth member of that panel?

(A) L
(B) P
(C) S
(D) T
(E) U

14. If S, P, and Q are selected as members of a four-member panel and if T is not available to serve, the fourth member selected must be

(A) K
(B) L
(C) M
(D) R
(E) U

15. How many different, acceptable five-member panels can be formed if both S and R must be selected as members?

(A) 0
(B) 1
(C) 2
(D) 3
(E) 4

GO ON TO THE NEXT PAGE.

Questions 16-22

At Camp Lone Pine, each of ten camp buildings has its own patio in front of it. At the camp, there are exactly five trails, which cross the patios. Anyone arriving at or departing from a building must cross its patio.

The Woods Trail begins at the patio of the Director's Building and goes only to the patios of Cabins 1 through 5 in numerical order. The Lake Trail goes only from the patio of the Director's Building to the patios of the Craft Barn, the Dining Hall, and the Boathouse in that order. The Bridge Trail goes only between the patio of Cabin 3 and the patio of the Dining Hall. The Meadow Trail goes only between the patio of the Dining Hall and the patio of the Athletic Equipment Shed. The Rocky Trail goes only between the patio of the Boathouse and the patio of Cabin 5. No two trails intersect. Travel between the buildings must conform to the following requirements:

Campers and staff can travel in either direction on all trails.
All travel between buildings must take place on existing trails, and there are no other buildings or trails at the camp.

16. A camper traveling from the Boathouse to the Craft Barn must use which of the following trails?

(A) The Bridge Trail
(B) The Lake Trail
(C) The Meadow Trail
(D) The Rocky Trail
(E) The Woods Trail

17. What is the minimum number of trails a camper must use in going from Cabin 2 to the Athletic Equipment Shed?

(A) One
(B) Two
(C) Three
(D) Four
(E) Five

18. A trip between the two buildings in which of the following pairs can be made using only one trail?

(A) Cabin 2, Boathouse
(B) Cabin 3, Athletic Equipment Shed
(C) Craft Barn, Cabin 5
(D) Dining Hall, Cabin 1
(E) Director's Building, Cabin 4

19. A trip between the two buildings in which of the following pairs requires the use of a minimum of three trails?

(A) Athletic Equipment Shed, Cabin 4
(B) Boathouse, Cabin 1
(C) Cabin 3, Director's Building
(D) Craft Barn, Cabin 5
(E) Dining Hall, Cabin 2

20. A camper using the minimum number of trails to go from Cabin 4 to the Athletic Equipment Shed must cross the patio of which of the following buildings?

(A) Boathouse
(B) Cabin 1
(C) Cabin 3
(D) Craft Barn
(E) Director's Building

21. A camper starting at Cabin 2 could reach the Athletic Equipment Shed by using only which of the following trails in the order given?

(A) Lake, Bridge, Woods, Rocky
(B) Rocky, Lake, Meadow, Woods
(C) Woods, Lake, Rocky, Meadow
(D) Woods, Rocky, Bridge, Meadow
(E) Woods, Rocky, Lake, Meadow

22. A camper could travel from the Dining Hall to which of the following buildings by two different routes, each route crossing the same number of patios but not crossing any patio twice?

(A) Cabin 1
(B) Cabin 2
(C) Cabin 4
(D) Cabin 5
(E) Director's Building

GO ON TO THE NEXT PAGE.

23. Scientists now believe that artificial-hip implants, previously thought to be safe, may actually increase the risk of cancer in recipients after about 45 years of use. Though these implants do improve the quality of recipients' lives, the increased risk of cancer is an unacceptable price to pay for these improvements. Therefore, they should be banned.

Which of the following, if true, is the strongest counterargument to the argument above?

(A) Artificial-hip implant surgery can cause severe complications, such as infection, chronic fever, and bone degeneration, and these complications can themselves be crippling or even fatal.
(B) Almost all artificial-hip implant recipients receive their implants at an age when they are unlikely to live more than an additional 30 years.
(C) Although artificial-hip implants increase the risk of cancer after about 45 years of use, a few of the cancers they induce are not fatal.
(D) Since artificial-hip implants are not very common, banning them would cause little hardship.
(E) Although the benefits of artificial-hip implant surgery have remained substantially the same over the past decade, the price of the surgery has risen considerably.

24. When released into the atmosphere, the refrigerant Freon damages the Earth's ozone layer. A new kind of refrigerant does not have this effect. The manufacturer claims that replacing Freon with the new refrigerant in both new and existing refrigerators will prevent any further Freon damage to the ozone layer apart from that being done by the Freon already in the atmosphere.

Which of the following must be true if the manufacturer's prediction is to prove accurate?

(A) Freon can be replaced with the new refrigerant without releasing any Freon into the atmosphere.
(B) The damage already done to the ozone layer is not of environmentally significant proportions.
(C) The atmosphere can reverse the damage to the ozone layer caused by the past use of Freon.
(D) The new refrigerant can counteract the damaging effects of Freon on the Earth's atmosphere.
(E) The new refrigerant causes no environmental damage of any kind when it is released into the atmosphere.

GO ON TO THE NEXT PAGE.

25. Any United States flag manufactured outside the United States should be banned from importation, since some foreign manufacturers superimpose images on the United States flag and sell such products with relative impunity. United States manufacturers, on the other hand, would face penalties for such violations of the United States flag code.

Which of the following is the best criticism of the argument above?

(A) The argument reiterates its conclusion instead of providing a reason for it.
(B) The argument makes an irrelevant distinction between foreign and United States manufacturers.
(C) The reason given for the ban undermines rather than supports the conclusion.
(D) The reason given for the ban does not explain why images superimposed on the United States flag are offensive.
(E) The reason given for the ban applies only to a part of the group of manufacturers whose flags are included in the ban, not necessarily to all.

SECTION 4

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. A recent survey shows that, while ninety-four percent of companies conducting management-training programs open them to women, women are ------- only seventy-four percent of those programs.

   (A) protesting against
   (B) participating in
   (C) displeased by
   (D) allowed in
   (E) refused by

2. Thomas Paine, whose political writing was often flamboyant, was in private life a surprisingly ------- man: he lived in rented rooms, ate little, and wore drab clothes.

   (A) simple
   (B) controversial
   (C) sordid
   (D) comfortable
   (E) discourteous

3. Their ------- of loyalties is first to oneself, next to kin, then to fellow tribe members, and finally to compatriots.

   (A) merging
   (B) hierarchy
   (C) definition
   (D) judgment
   (E) cognizance

4. The belief that science destroys the arts appears to be supported by historical evidence that the arts have ------- only when the sciences have been -------.

   (A) declined. .attacked
   (B) flourished. .neglected
   (C) matured. .unconcerned
   (D) succeeded. .developed
   (E) floundered. .constrained

5. The action and characters in a melodrama can be so immediately ------- that all observers can hiss the villain with an air of smug but enjoyable -------.

   (A) spurned. .boredom
   (B) forgotten. .condescension
   (C) classified. .self-righteousness
   (D) plausible. .guilt
   (E) gripping. .skepticism

6. In the design of medical experiments, the need for ------- assignment of treatments to patients must be ------- the difficulty of persuading patients to participate in an experiment in which their treatment is decided by chance.

   (A) independent. .amended by
   (B) competent. .emphasized by
   (C) mechanical. .controlled by
   (D) swift. .associated with
   (E) random. .reconciled with

7. Though dealers insist that professional art dealers can make money in the art market, even an ------- knowledge is not enough: the art world is so fickle that stock-market prices are ------- by comparison.

   (A) amateur's. .sensible
   (B) expert's. .erratic
   (C) investor's. .booming
   (D) insider's. .predictable
   (E) artist's. .irrational

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. EXERCISE : STRONG ::
   (A) perform : shy
   (B) watch : alert
   (C) decide : astute
   (D) drink : thirsty
   (E) read : knowledgeable

9. COWARD : BRAVE ::
   (A) hero : cynical
   (B) martyr : impatient
   (C) philanthropist : selfish
   (D) agnostic : intuitive
   (E) traitor : careful

10. CREDITS : MOVIE ::
    (A) byline : article
    (B) copyright : song
    (C) rehearsal : dance
    (D) dedication : book
    (E) title : work

11. COMPENDIUM : SUMMARY ::
    (A) anthology : collection
    (B) encyclopedia : knowledge
    (C) dissertation : collaboration
    (D) brochure : solicitation
    (E) précis : paragraph

12. COHABIT : RESIDE ::
    (A) conspire : plot
    (B) coincide : contradict
    (C) secrete : conceal
    (D) infiltrate : influence
    (E) frame : incriminate

13. CACOPHONY : SOUND ::
    (A) crescendo : music
    (B) friction : heat
    (C) ripple : liquid
    (D) glare : light
    (E) meter : measurement

14. STRATAGEM : DECEIVE ::
    (A) epithet : correspond
    (B) oration : publish
    (C) conservation : expend
    (D) concession : placate
    (E) sentence : prosecute

15. SPECIOUS : GENUINENESS ::
    (A) illusory : reality
    (B) impulsive : purposefulness
    (C) precipitate : speed
    (D) cunning : duplicity
    (E) imaginary : mind

16. DECLAMATION : GRANDILOQUENCE ::
    (A) exclamation : importance
    (B) proclamation : consent
    (C) diatribe : abuse
    (D) question : insistence
    (E) provocation : betrayal

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Historians have only recently begun to note the increase in demand for luxury goods and services that took place in eighteenth-century England. McKendrick has explored the Wedgwood firm's remarkable success in marketing luxury pottery; Plumb has written about the proliferation of provincial theaters, musical festivals, and children's toys and books. While the fact of this consumer revolution is hardly in doubt, three key questions remain: Who were the consumers? What were their motives? And what were the effects of the new demand for luxuries?

An answer to the first of these has been difficult to obtain. Although it has been possible to infer from the goods and services actually produced what manufacturers and servicing trades thought their customers wanted, only a study of relevant personal documents written by actual consumers will provide a precise picture of *who* wanted what. We still need to know how large this consumer market was and how far down the social scale the consumer demand for luxury goods penetrated. With regard to this last question, we might note in passing that Thompson, while rightly restoring laboring people to the stage of eighteenth-century English history, has probably exaggerated the opposition of these people to the inroads of capitalist consumerism in general; for example, laboring people in eighteenth-century England readily shifted from home-brewed beer to standardized beer produced by huge, heavily capitalized urban breweries.

To answer the question of why consumers became so eager to buy, some historians have pointed to the ability of manufacturers to advertise in a relatively uncensored press. This, however, hardly seems a sufficient answer. McKendrick favors a Veblen model of conspicuous consumption stimulated by competition for status. The "middling sort" bought goods and services because they wanted to follow fashions set by the rich. Again, we may wonder whether this explanation is sufficient. Do not people enjoy buying things as a form of self-gratification? If so, consumerism could be seen as a product of the rise of new concepts of individualism and materialism, but not necessarily of the frenzy for conspicious competition.

Finally, what were the consequences of this consumer demand for luxuries? McKendrick claims that it goes a long way toward explaining the coming of the Industrial Revolution. But does it? What, for example, does the production of high-quality pottery and toys have to do with the development of iron manufacture or textile mills? It is perfectly possible to have the psychology and reality of a consumer society without a heavy industrial sector.

That future exploration of these key questions is undoubtedly necessary should not, however, diminish the force of the conclusion of recent studies: the insatiable demand in eighteenth-century England for frivolous as well as useful goods and services foreshadows our own world.

17. In the first paragraph, the author mentions McKendrick and Plumb most probably in order to
    (A) contrast their views on the subject of luxury consumerism in eighteenth-century England
    (B) indicate the inadequacy of historiographical approaches to eighteenth-century English history
    (C) give examples of historians who have helped to establish the fact of growing consumerism in eighteenth-century England
    (D) support the contention that key questions about eighteenth-century consumerism remain to be answered
    (E) compare one historian's interest in luxury goods such as pottery to another historian's interest in luxury services such as musical festivals

18. Which of the following items, if preserved from eighteenth-century England, would provide an example of the kind of documents mentioned in lines 16-17 ?
    (A) A written agreement between a supplier of raw materials and a supplier of luxury goods
    (B) A diary that mentions luxury goods and services purchased by its author
    (C) A theater ticket stamped with the date and name of a particular play
    (D) A payroll record from a company that produced luxury goods such as pottery
    (E) A newspaper advertisement describing luxury goods and services available at a seaside resort

GO ON TO THE NEXT PAGE.

19. According to the passage, Thompson attributes to laboring people in eighteenth-century England which of the following attitudes toward capitalist consumerism?

(A) Enthusiasm
(B) Curiosity
(C) Ambivalence
(D) Stubbornness
(E) Hostility

20. In the third paragraph, the author is primarily concerned with

(A) contrasting two theses and offering a compromise
(B) questioning two explanations and proposing a possible alternative to them
(C) paraphrasing the work of two historians and questioning their assumptions
(D) examining two theories and endorsing one over the other
(E) raising several questions but implying that they cannot be answered.

21. According to the passage, a Veblen model of conspicuous consumption has been used to

(A) investigate the extent of the demand for luxury goods among social classes in eighteenth-century England
(B) classify the kinds of luxury goods desired by eighteenth-century consumers
(C) explain the motivation of eighteenth-century consumers to buy luxury goods
(D) establish the extent to which the tastes of rich consumers were shaped by the middle classes in eighteenth-century England
(E) compare luxury consumerism in eighteenth-century England with such consumerism in the twentieth century

22. According to the passage, eighteenth-century England and the contemporary world of the passage's readers are

(A) dissimilar in the extent to which luxury consumerism could be said to be widespread among the social classes
(B) dissimilar in their definitions of luxury goods and services
(C) dissimilar in the extent to which luxury goods could be said to be a stimulant of industrial development
(D) similar in their strong demand for a variety of goods and services
(E) similar in the extent to which a middle class could be identified as imitating the habits of a wealthier class

23. It can be inferred from the passage that the author would most probably agree with which of the following statements about the relationship between the Industrial Revolution and the demand for luxury goods and services in eighteenth-century England?

(A) The growing demand for luxury goods and services was a major factor in the coming of the Industrial Revolution.
(B) The Industrial Revolution exploited the already existing demand for luxury goods and services.
(C) Although the demand for luxury goods may have helped bring about the Industrial Revolution, the demand for luxury services did not.
(D) There is no reason to believe that the Industrial Revolution was directly driven by a growing demand for luxury goods and services.
(E) The increasing demand for luxury goods and services was a cultural phenomenon that has been conclusively demonstrated to have been separate from the coming of the Industrial Revolution.

GO ON TO THE NEXT PAGE.

Researchers are finding that in many ways an individual bacterium is more analogous to a component cell of a multicellular organism than it is to a free-living, autonomous organism. *Anabaena*, a freshwater bacteria, is a case in point. Among photosynthetic bacteria, *Anabaena* is unusual: it is capable of both photosynthesis and nitrogen fixation. Within a single cell, these two biochemical processes are incompatible: oxygen, produced during photosynthesis, inactivates the nitrogenase required for nitrogen fixation. In *Anabaena* communities, however, these processes can coexist. When fixed nitrogen compounds are abundant, *Anabaena* is strictly photosynthetic and its cells are all alike. When nitrogen levels are low, however, specialized cells called heterocysts are produced which lack chlorophyll (necessary for photosynthesis) but which can fix nitrogen by converting nitrogen gas into a usable form. Submicroscopic channels develop which connect the heterocyst cells with the photosynthetic ones and which are used for transferring cellular products between the two kinds of *Anabaena* cells.

24. According to the passage, which of the following statements is true of bacteria that engage in photosynthesis?

(A) They eventually become two autonomous cells.
(B) They cannot normally also engage in nitrogen fixation.
(C) Oxygen normally inactivates them.
(D) Cellular products are constantly transferred between such bacteria.
(E) They normally lack chlorophyll.

25. It can be inferred from the passage that cell differentiation within *Anabaena* is regulated by the

(A) amount of oxygen *Anabaena* cells produce
(B) season of the year
(C) amount of fixed nitrogen compounds available
(D) number of microscopic channels uniting *Anabaena* cells
(E) amount of chlorophyll in *Anabaena* cells

26. The passage supports which of the following inferences about heterocysts?

(A) Heterocysts do not produce oxygen.
(B) Nitrogen gas inactivates heterocysts.
(C) Chlorophyll increases the productivity of heterocysts.
(D) Heterocysts allow nitrogen fixation and photosynthesis to occur in the same cell.
(E) Heterocysts are more important for *Anabaena's* functioning than are photosynthetic cells.

27. The author uses the example of *Anabaena* to illustrate the

(A) uniqueness of bacteria among unicellular organisms
(B) inadequacy of an existing view of bacteria
(C) ability of unicellular organisms to engage in photosynthesis
(D) variability of a freshwater bacteria
(E) difficulty of investigating even the simplest unicellular organisms

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. DILUTE: (A) fill (B) affirm (C) install (D) agitate (E) concentrate

29. FERVOR: (A) discontent (B) testimony (C) apathy (D) outrage (E) impertinence

30. EMACIATE: (A) lengthen (B) insult (C) soothe (D) fatten (E) masticate

31. BOMBASTIC: (A) understated (B) unimpressive (C) derivative (D) enigmatic (E) complex

32. OCCULT: (A) informal (B) innocuous (C) hypocritical (D) gradually refined (E) readily fathomable

33. TACIT: (A) determined (B) illicit (C) discrete (D) necessary (E) explicit

34. DESICCATE: (A) add fertilizer to (B) add water to (C) cement (D) suspend (E) homogenize

35. CHICANERY: (A) honest opinion (B) sound investment (C) unfashionable item (D) aboveboard action (E) intricate plan

36. DISAFFECT: (A) win over (B) fail to proceed (C) cause to improve (D) include (E) reinstate

37. CASTIGATION: (A) affection (B) solicitousness (C) sincerity (D) commitment (E) approbation

38. SINECURE: (A) optimistic forecast (B) voluntary restriction (C) unwelcome news (D) arduous employment (E) overdue assistance

SECTION 5

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

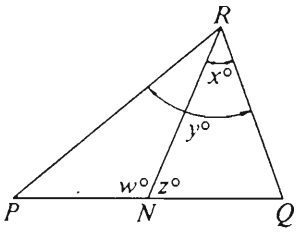
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

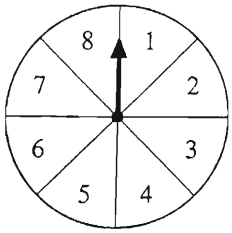
Examples 2-4 refer to $\triangle PQR$.

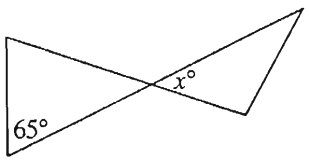


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

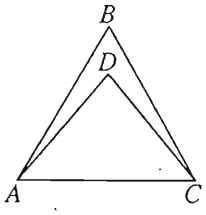
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

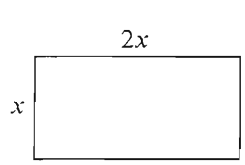
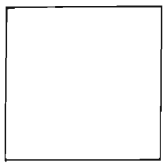
	Column A	Column B
		
	The circular board is divided into 8 sectors of equal area.	
1.	The number of the sector on which the pointer comes to rest after rotating 480° clockwise from the position shown	6
	The average (arithmetic mean) of x, $2x$, and 15 is 12.	
2.	x	8
	$\frac{2t}{5} = 5$	
3.	t^2	144
	$\begin{array}{r} 153.2 \\ -\ yx.y \\ \hline 63.4 \end{array}$	
	In the correctly performed subtraction shown above, x and y represent digits between 0 and 9, inclusive.	
4.	$x + y$	17

	Column A	Column B
		
5.	x	50
	$x > 0$	
6.	$(x - 4)(x + 5)$	$x^2 - 20$
	n is a positive integer.	
7.	$(-1)^n + (-1)^{n+1}$	0
	$0 < x < y$	
8.	$4y$	$5x$

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Column A	Column B
A contractor can purchase paint at \$19.50 per gallon or at the bulk rate of 20 gallons for \$335.00.	
9. The amount saved per gallon by purchasing 20 gallons of the paint at the bulk rate rather than by the gallon	\$2.75
Circle F has circumference 4.	
10. The radius of F	1
 $\triangle ABC$ is equilateral.	
11. The measure of $\angle ADC$	60°
$xy = 2$, $x > 0$, $y > 0$	
12. $x + y$	5

Column A	Column B
 Rectangle R	 Square S
The perimeters of R and S are equal.	
13. The area of R	The area of S
$\frac{r}{s} = -1$	
14. $\frac{r+s}{r}$	rs
The average (arithmetic mean) of a set of n test scores is 80. The average (arithmetic mean) of these n scores together with a score of 85 is 81.	
15. n	5

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. Nine pieces of paper numbered consecutively from 1 to 9 are put into a hat. If one piece of paper is drawn at random from the hat, what is the probability that it will have an even number?

(A) $\frac{1}{9}$

(B) $\frac{2}{9}$

(C) $\frac{4}{9}$

(D) $\frac{1}{2}$

(E) $\frac{5}{9}$

17. If $6x - 4 = 5x + 3$, then $x =$

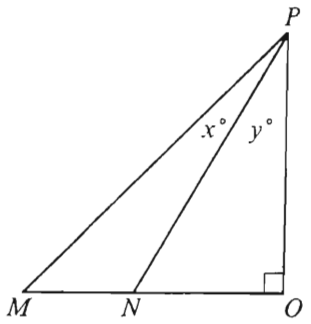
(A) -7
(B) -1
(C) 1
(D) 7
(E) 12

18. If p is a positive integer, which of the following could be a prime number?

(A) $8p$
(B) $8p + 1$
(C) $8p + 2$
(D) $8p + 4$
(E) $8p + 6$

19. A school district has 1,989 computers, which is approximately one computer for every 68.6 students. Of the following, which is the closest approximation, in thousands, of the number of students in the school district?

(A) 30
(B) 120
(C) 140
(D) 160
(E) 200



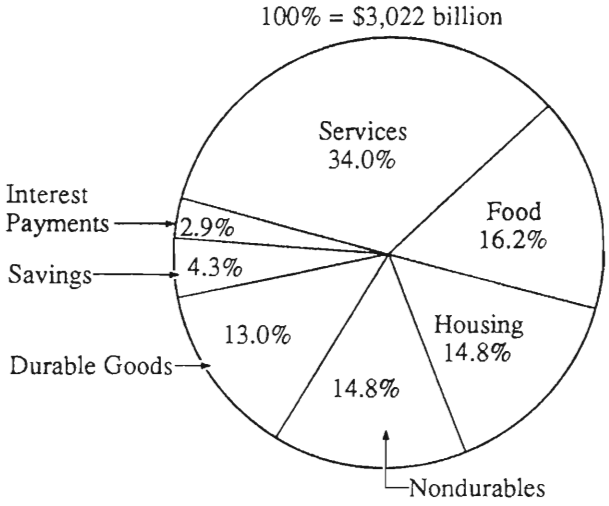
20. In the figure above, if $MO = OP$, then $y =$

(A) $45 - x$
(B) $90 - x$
(C) x
(D) $45 + x$
(E) $60 + x$

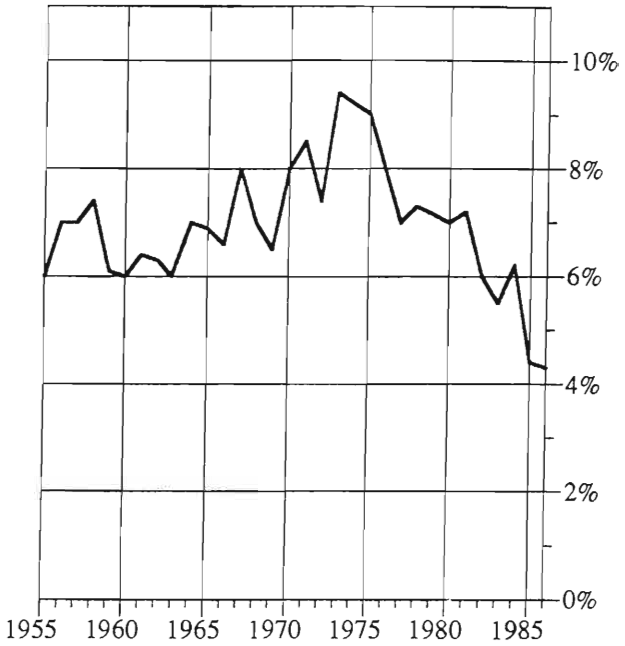
GO ON TO THE NEXT PAGE.

Questions 21-25 are based on the following graphs for Country X.

EXPENDITURE OF DISPOSABLE PERSONAL INCOME: 1986



SAVINGS AS A PERCENT OF DISPOSABLE PERSONAL INCOME: 1955-1986



Note: Graphs drawn to scale.

GO ON TO THE NEXT PAGE.

21. In 1986 approximately how many billion dollars were spent on durable goods?

(A) 91
(B) 393
(C) 453
(D) 504
(E) 1,007

22. In 1986 housing and nondurables together accounted for approximately what fraction of disposable personal income?

(A) $\frac{1}{8}$
(B) $\frac{3}{20}$
(C) $\frac{1}{6}$
(D) $\frac{1}{4}$
(E) $\frac{3}{10}$

23. Savings as a percent of disposable personal income was approximately how many times as great in 1975 as in 1955 ?

(A) 0.6
(B) 0.8
(C) 1.3
(D) 1.5
(E) 1.7

24. If the gross national product in 1986 was $1,213 billion more than disposable personal income, then savings that year were approximately what percent of the gross national product?

(A) 1.5%
(B) 2%
(C) 2.5%
(D) 3%
(E) 6%

25. Which of the following statements can be inferred from the graphs?

I. In 1986 more than $1,000 billion of disposable personal income was spent for services.
II. From 1955 to 1986, inclusive, savings as a percent of disposable personal income was never greater than 8.5 percent.
III. The total dollar amount of savings was greater in 1975 than in 1980.

(A) I only
(B) II only
(C) III only
(D) I and III only
(E) I, II, and III

GO ON TO THE NEXT PAGE.

26. The sum of 2 numbers, x and y, equals twice their product. If $x = 3$, what is the value of y?

(A) $\frac{1}{8}$

(B) $\frac{3}{5}$

(C) $\frac{3}{2}$

(D) $\frac{5}{3}$

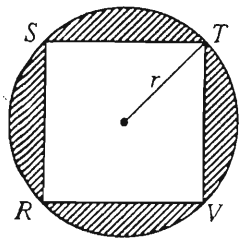
(E) $\frac{7}{3}$

27. Among all isosceles triangles RST having the measure of angle S equal to 40°, what is the largest possible measure for angle R?

(A) 40°
(B) 70°
(C) 90°
(D) 100°
(E) It cannot be determined from the information given.

28. S is the sum of three consecutive integers, the greatest of which is x. In terms of S, which of the following is the sum of three consecutive integers, the least of which is x?

(A) $S - 6$
(B) $S - 3$
(C) $S + 3$
(D) $S + 6$
(E) $2S$



29. In the figure above, $RSTV$ is a square inscribed in a circle with radius r. In terms of r, what is the total area of the shaded regions?

(A) $r^2(\pi - 2)$
(B) $2r(2 - \pi)$
(C) $\pi(r^2 - 2)$
(D) $\pi r^2 - 8r$
(E) $\pi r^2 - 4r$

30. An emergency vehicle travels 10 miles at a speed of 50 miles per hour. How fast must the vehicle travel on the return trip if the round-trip travel time is to be 20 minutes?

(A) 55 mph
(B) 60 mph
(C) 65 mph
(D) 70 mph
(E) 75 mph

SECTION 7

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-6

Every week the owner of a produce store offers a special sale on either one or two vegetables, charging half-price for vegetables that are on special. During one four-week period, week 1 through week 4, the owner will offer a special on each of six vegetables: lettuce, onions, peas, radishes, squash, and tomatoes. Each vegetable will be on special for exactly one of the four weeks according to the following conditions:

A week in which two vegetables are on special cannot be immediately followed by another week in which two vegetables are on special.

Radishes must be on special in week 3.

Tomatoes must be on special in a week in which two vegetables are on special.

Peas must be on special in a week sometime before the week in which lettuce is on special.

Squash must be on special in a week sometime before the week in which onions are on special.

1. If only one vegetable is on special in week 1, that vegetable could be

   (A) lettuce
   (B) onions
   (C) peas
   (D) radishes
   (E) tomatoes

2. Which of the following could be on special together in week 2 ?

   (A) Lettuce and onions
   (B) Onions and peas
   (C) Onions and squash
   (D) Peas and radishes
   (E) Radishes and tomatoes

3. If peas are on special in the same week as radishes, which of the following must be true?

   (A) Lettuce is on special in week 2.
   (B) Onions are on special in week 1.
   (C) Onions are on special in week 2.
   (D) Squash is on special in week 4.
   (E) Tomatoes are on special in week 4.

4. If lettuce is on special in the same week as onions, which of the following must be true?

   (A) Peas are on special in week 1.
   (B) Squash is on special in week 2.
   (C) Tomatoes are on special in week 2.
   (D) Tomatoes are on special in week 3.
   (E) Lettuce is on special in week 4.

5. If squash is on special in week 3, which of the following must be on special in a week in which only one vegetable is on special?

   (A) Lettuce
   (B) Peas
   (C) Radishes
   (D) Squash
   (E) Tomatoes

6. If lettuce is on special in the same week as squash, which of the following must be true?

   (A) Lettuce is on special in week 3.
   (B) Peas are on special in week 2.
   (C) Squash is on special in week 1.
   (D) Tomatoes are on special in week 3.
   (E) Tomatoes are on special in week 4.

GO ON TO THE NEXT PAGE.

7. Jones: Because he is a superb athlete, Bob is qualified for admission to the Hall of Fame.

   Smith: But because Bob has used illegal drugs, he is a poor role model for young people. Therefore, Bob should not be admitted to the Hall of Fame.

   Smith's conclusion depends on which of the following assumptions?

   (A) Superb athletes usually do not use illegal drugs.
   (B) Bob is interested in being admitted to the Hall of Fame.
   (C) Bob's use of illegal drugs has had a negative effect on his athletic performance.
   (D) Being an adequate role model for young people should be one of the criteria for admission to the Hall of Fame.
   (E) All athletes who are good role models for young people are qualified for admission to the Hall of Fame.

8. The population of peregrine falcons declined rapidly during the 1950's and 1960's and reached an all-time low in the early 1970's. The decline was attributed by scientists to the widespread use of the pesticide DDT in rural areas.

   Which of the following, if true, gives the strongest support to the scientists' claim?

   (A) DDT was not generally in use in areas devoted to heavy industry.
   (B) In the time since the use of DDT was banned in 1972, the population of peregrine falcons has been steadily increasing.
   (C) Peregrine falcons, like other birds of prey, abandon eggs that have fallen out of the nest, even if the eggs remain intact.
   (D) Starlings, house sparrows, and blue jays—birds the peregrine falcon preys on—were not adversely affected by DDT in their habitats.
   (E) Other birds of prey, such as the osprey, the bald eagle, and the brown pelican, are found in the same areas as is the peregrine falcon.

9. Last summer one out of every five teen-agers who sought employment failed to find it. This is hard to understand, since during this same time employers were searching for teen-agers to fill an abundance of summer jobs. Many employers had been offering good pay and, in some cases, medical benefits.

   Which of the following, if true, most helps to explain why teen-age unemployment was high when there were many job openings?

   (A) Most summer jobs are located in suburban areas that are inaccessible to the high proportion of teen-agers who live in cities.
   (B) During the summer, some teen-agers continue to work at jobs that they have held during the school year.
   (C) Many summer jobs offer training that will help the teen-ager secure a full-time position after graduation.
   (D) A small percentage of teen-agers either attend summer school or go away to camp and thus have no time for a job.
   (E) Many state programs that have been developed to help teen-agers find summer employment have recently had their budgets increased.

GO ON TO THE NEXT PAGE.

Questions 10-16

Six horses—with the names "Greatness," "Leverage," "Mistletoe," "Turnabout," "Vigilance," and "Zodiac"—are entered in a race. The starting gate is divided into exactly seven starting positions numbered consecutively 1 through 7. Seven jockeys—also numbered 1 through 7—are eligible to ride in the race. Each jockey's number corresponds to the numbered position in the starting gate from which that jockey, if assigned to a horse, will ride. Exactly one jockey will not be assigned to any horse, and the starting-gate position corresponding to that jockey's number will remain vacant for the race. Jockeys will be assigned to horses and the horses will run from starting-gate positions in accordance with the following restrictions:

Either Greatness or Mistletoe must be ridden by Jockey 1.

Vigilance must be ridden by Jockey 4 or else by Jockey 5.

Leverage and Vigilance must have at least one horse separating the two of them in the starting gate.

Mistletoe must run from a starting-gate position with a lower number than the starting-gate position from which Zodiac runs.

10. Which of the following could be an accurate list of three horses running from starting-gate positions 1, 2, and 3, respectively?

(A) Greatness, Turnabout, Vigilance
(B) Greatness, Zodiac, Mistletoe
(C) Leverage, Mistletoe, Zodiac
(D) Mistletoe, Turnabout, Greatness
(E) Mistletoe, Vigilance, Zodiac

11. Which of the following starting-gate positions must have a horse running from it?

(A) 1
(B) 2
(C) 3
(D) 4
(E) 7

12. Leverage could start from any of the following starting-gate positions EXCEPT

(A) 2
(B) 3
(C) 4
(D) 6
(E) 7

13. If Mistletoe runs from starting-gate position 5 and if starting-gate position 6 is vacant, which of the following must be true?

(A) Greatness starts from starting-gate position 2.
(B) Leverage starts from starting-gate position 7.
(C) Vigilance starts from starting-gate position 3.
(D) Turnabout starts from starting-gate position 3.
(E) Zodiac starts from starting-gate position 2.

14. If the horses finish the race, from first to last, in exactly the order 6, 5, 4, 3, 2, and 1 (corresponding to the numbers of their jockeys), and if Leverage is the horse that wins the race, then each of the following horses could have been among the top three finishers in the race EXCEPT

(A) Greatness
(B) Mistletoe
(C) Turnabout
(D) Vigilance
(E) Zodiac

15. If Jockey 5 is the one jockey <u>not</u> assigned to any horse, which of the following could be true?

(A) Greatness is ridden by Jockey 4.
(B) Leverage is ridden by Jockey 6.
(C) Mistletoe is ridden by Jockey 7.
(D) Turnabout is ridden by Jockey 4.
(E) Zodiac is ridden by Jockey 6.

16. If Turnabout is incapable of running in the race and no replacement horse is found, and if the horses that do run finish the race, from first to last, in the order 1, 2, 4, 6, and 7 (corresponding to the numbers of their jockeys), which of the following must have finished last in the race?

(A) Greatness
(B) Leverage
(C) Mistletoe
(D) Vigilance
(E) Zodiac

GO ON TO THE NEXT PAGE.

Questions 17-22

The curator of a sculpture garden is planning an exhibit. Seven statues—F, G, H, J, R, S, and U—are to be exhibited, three on the south lawn, four on the north lawn. Four of the statues—F, G, H, and J—are made of steel, and three—R, S, and U—are made of bronze. The curator will satisfy the following requirements in setting up the exhibit:

Each lawn will have at most two bronze statues placed on it.
G cannot be on the same lawn as U.
H cannot be on the same lawn as R.

17. Which of the following groups could be placed on the north lawn?

(A) F, G, H, and U
(B) F, H, S, and U
(C) G, H, R, and U
(D) G, J, R, and U
(E) J, R, S, and U

18. If U and R are placed on the north lawn, which of the following groups must be placed on the south lawn?

(A) F, G, and H
(B) F, J, and S
(C) G, H, and S
(D) G, H, and U
(E) H, S, and U

19. If S and U are placed on the south lawn, each of the following must be placed on the north lawn EXCEPT

(A) F
(B) G
(C) H
(D) J
(E) R

20. If S and R are placed on the south lawn, which of the following must also be placed on the south lawn?

(A) F
(B) G
(C) H
(D) J
(E) U

21. If G and H are placed on the south lawn, which of the following must also be placed on the south lawn?

(A) F
(B) J
(C) R
(D) S
(E) U

22. If F and G are placed on the north lawn, which of the following groups could be placed on the south lawn?

(A) H, J, and S
(B) H, J, and U
(C) H, R, and U
(D) J, S, and U
(E) R, S, and U

GO ON TO THE NEXT PAGE.

23. According to official government records, in Greenland the suicide rate (suicides per 1,000 people) was seventeen times greater in 1987 than in 1960. Because Greenland changed from a hunting and fishing society to an industrial society between 1960 and 1987, the dramatic increase in suicide must be a result of this societal change.

    Which of the following, if true, casts the most serious doubt on the conclusion drawn above?

    (A) The change from a hunting and fishing society to an industrial society sometimes causes a dramatic increase in a society's crime rate.
    (B) Even in a hunting and fishing society, some proportion of the society's members will choose to commit suicide.
    (C) According to official government records, most of those who committed suicide in Greenland in 1987 were male.
    (D) The life expectancy of Greenland's inhabitants was not much greater in 1987 than it was in 1960, before the societal change occurred.
    (E) In 1987 most suicides that occurred in Greenland were reported as suicides to the appropriate government office, whereas in 1960 most were not.

24. It is a general rule of economics that as the price of an item rises, demand for that item falls and that when the price falls, demand rises. Yet in the United States in 1980, after the price of canned soup rose, demand for canned soup also rose.

    Which of the following, if true about the period when prices for canned soup were rising, best resolves the discrepancy described above?

    (A) Because retail prices fell for both meat and vegetables, the major ingredients of most canned soups, canned soup became more expensive than foods that could be prepared at home with these ingredients.
    (B) Dehydrated soup gained in sales at the expense of canned soup.
    (C) Because the retail prices of other foodstuffs rose faster than the price of canned soup, canned soup became cheaper relative to other foodstuffs.
    (D) Because the retail prices and demand for most other foodstuffs remained stable, demand for them decreased relative to demand for canned soup.
    (E) Consumers became increasingly concerned about the adverse effects of high salt content in many canned soups.

GO ON TO THE NEXT PAGE.

25. New employees of Ace Industries are complaining about discomfort caused by excessive noise inside Ace's factory. Experienced Ace factory employees, however, do not suffer any such discomfort. Although Ace accepts responsibility for the health of its employees, it has decided not to issue earplugs to new employees. Ace reasoned that the new employees would also become accustomed to the noise without using earplugs.

Which of the following, if true, indicates a flaw in Ace's decision not to issue earplugs to new employees?

(A) Because the noise in Ace's factory is absorbed by soundproof walls, it cannot be heard by Ace executives in their offices.
(B) Many of the new employees interviewed said they would not wear earplugs on the job.
(C) Issuing earplugs to all new employees would be a less effective method of reducing employees' exposure to noise than altering the machinery to be less noisy would be.
(D) The experienced employees' lack of discomfort is attributable to hearing loss caused by the factory noise.
(E) The machines in Ace's factory have not become any noisier since the experienced workers were originally hired.

FOR GENERAL TEST 19 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 1			Section 4		
Number	Answer	P+	Number	Answer	P+
1	D	91	1	B	90
2	D	93	2	A	93
3	C	93	3	B	93
4	A	78	4	B	86
5	A	73	5	C	60
6	D	67	6	E	72
7	B	44	7	D	61
8	D	87	8	E	95
9	C	70	9	C	75
10	E	55	10	A	62
11	C	55	11	A	45
12	B	43	12	A	61
13	A	47	13	D	51
14	E	39	14	D	51
15	E	34	15	A	38
16	D	39	16	C	26
17	D	65	17	C	75
18	C	87	18	B	85
19	B	79	19	E	36
20	A	54	20	B	42
21	A	64	21	C	76
22	C	38	22	D	60
23	B	85	23	D	53
24	A	42	24	B	70
25	E	26	25	C	73
26	E	24	26	A	29
27	E	23	27	B	28
28	C	93	28	E	92
29	B	86	29	C	80
30	C	66	30	D	65
31	B	55	31	A	54
32	D	49	32	E	46
33	E	55	33	E	44
34	E	51	34	B	54
35	B	44	35	D	36
36	C	44	36	A	37
37	E	23	37	E	28
38	A	21	38	D	15

QUANTITATIVE ABILITY					
Section 2			Section 5		
Number	Answer	P+	Number	Answer	P+
1	A	86	1	B	80
2	C	72	2	B	76
3	B	74	3	A	75
4	A	71	4	C	75
5	A	66	5	D	73
6	A	65	6	A	67
7	B	46	7	C	61
8	D	63	8	D	59
9	D	74	9	C	49
10	C	56	10	B	51
11	D	45	11	A	48
12	B	40	12	D	34
13	D	29	13	B	42
14	B	50	14	A	47
15	C	27	15	B	38
16	C	92	16	C	87
17	B	83	17	D	89
18	A	77	18	B	79
19	E	61	19	C	66
20	D	61	20	A	73
21	D	86	21	B	87
22	B	72	22	E	71
23	B	66	23	D	55
24	D	42	24	D	36
25	A	38	25	A	38
26	D	55	26	B	63
27	A	42	27	D	29
28	C	55	28	D	28
29	E	39	29	A	31
30	D	30	30	E	25

ANALYTICAL ABILITY					
Section 3			Section 7		
Number	Answer	P+	Number	Answer	P+
1	A	75	1	C	79
2	D	77	2	B	57
3	C	68	3	C	63
4	D	51	4	E	33
5	D	35	5	A	47
6	D	53	6	E	39
7	A	72	7	D	89
8	B	68	8	B	85
9	C	44	9	A	81
10	E	54	10	D	51
11	C	85	11	A	70
12	A	85	12	C	61
13	E	75	13	D	48
14	A	80	14	B	35
15	A	28	15	E	29
16	B	78	16	B	31
17	C	58	17	B	81
18	E	54	18	C	64
19	A	49	19	C	60
20	C	44	20	B	62
21	E	29	21	D	70
22	A	18	22	B	46
23	B	67	23	E	63
24	A	48	24	C	78
25	E	24	25	D	75

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 19 ONLY AND THE PERCENTS BELOW*

Raw Score	Verbal Scaled Score	Verbal % Below	Quantitative Scaled Score	Quantitative % Below	Analytical Scaled Score	Analytical % Below
73-76	800	99				
72	790	99				
71	770	99				
70	760	99				
69	750	98				
68	740	98				
67	720	96				
66	710	95				
65	700	94				
64	690	94				
63	670	91				
62	660	90				
61	650	88				
60	640	87	800	96		
59	620	84	800	96		
58	610	82	800	96		
57	600	80	790	95		
56	590	78	780	93		
55	580	76	780	93		
54	570	73	770	92		
53	560	71	760	90		
52	550	69	750	88		
51	540	66	740	87		
50	530	63	730	84	800	98
49	520	60	720	82	800	98
48	510	58	710	80	800	98
47	500	55	700	78	790	98
46	490	52	690	77	770	97
45	480	50	680	75	760	96
44	470	47	670	73	750	95
43	460	43	660	70	730	93
42	460	43	650	68	710	90
41	450	40	640	66	700	89
40	440	37	630	64	680	85
39	430	34	620	62	670	83
38	420	31	610	60	660	81
37	420	31	600	58	650	79
36	410	28	580	53	640	77
35	400	25	570	50	630	74
34	390	22	560	48	610	70
33	390	22	550	46	600	66
32	380	20	540	43	580	61
31	370	18	530	41	570	58
30	360	15	520	39	550	52
29	360	15	510	36	540	49
28	350	13	490	32	530	47
27	340	11	480	30	510	41
26	340	11	470	27	490	36
25	330	9	460	25	480	33
24	320	8	450	23	460	28
23	300	5	440	21	450	26
22	290	4	420	17	430	22
21	290	4	410	15	420	19
20	280	3	400	14	400	16
19	270	2	380	11	390	14
18	260	2	370	9	370	11
17	250	1	360	8	350	8
16	240	1	340	6	340	7
15	230	1	320	4	320	5
14	220	1	310	3	300	3
13	200	1	290	2	290	3
12	200	1	270	1	280	2
11	200	1	250	1	260	1
10	200	1	240	1	240	1
9	200	1	230	1	230	1
8	200	1	210	1	220	1
7	200	1	200	1	210	1
6	200	1	200	1	210	1
0-5	200	1	200	1	200	1

*Percent scoring below the scaled score is based on the performance of 1,040,336 examinees who took the General Test between October 1, 1988, and September 30, 1991. This percent below information is used for score reports during the 1992-93 testing year.

TEST 20

SECTION 1

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-3

Samples of a yellow feed grain must be tested for contamination by one or more of the toxins R, S, and T. A sample retains the color it acquires from a test unless another test changes the color of the sample.

Test X turns a sample green if the sample contains R or S, or both, and orange if it contains neither R nor S.

Test Z turns a sample purple if the sample contains T; if not, the sample retains the color it had prior to test Z.

1. A sample that contains R and S but not T will yield which of the following sequences of colors, the first after test X is used and the second after test Z is used?

   (A) Green, green
   (B) Green, purple
   (C) Orange, yellow
   (D) Orange, orange
   (E) Orange, purple

2. A sample that remains yellow when subjected to test Z and turns green when subjected to test X could be a sample containing

   (A) R, S, and T
   (B) S and T, but not containing R
   (C) T, but containing neither R nor S
   (D) S, but containing neither R nor T
   (E) neither R nor S nor T

3. The two tests will NOT distinguish between two samples containing which of the following?

	Sample 1	Sample 2
(A)	R, S, and T	R and S, but not T
(B)	R and S, but not T	S and T, but not R
(C)	R and T, but not S	S and T, but not R
(D)	R, but neither S nor T	Neither R nor S nor T
(E)	S, but neither R nor T	Neither R nor S nor T

GO ON TO THE NEXT PAGE.

4. The burden of taxation on the back of a people is not unlike the burden of a weight on the back of a horse. Just as a small burden badly placed may distress a horse that could carry with ease a much larger burden properly adjusted, so a people may be impoverished and their power of producing wealth destroyed by taxation that, if levied another way, could be borne with ease.

   The author's point is made by

   (A) pointing out an ambiguity
   (B) using an analogy
   (C) refuting a supposed counterexample
   (D) appealing to an authority
   (E) generalizing from a particular case

5. Artificial seaweed made of plastic has been placed on a section of coast in order to reverse beach erosion. The inventor of the seaweed has concluded that the recent buildup of sand on that section of coast proves that the artificial seaweed reverses beach erosion.

   Which of the following, if true, would most seriously weaken the inventor's conclusion?

   (A) The amount of recent sand buildup on that section of coast was less than had been predicted on the basis of the results obtained in controlled experiments.
   (B) Because artificial seaweed would be buried eventually by additional sand deposits on the coast, more artificial seaweed would need to be put in place every four years.
   (C) Artificial seaweed of another material which had been previously developed by the inventor failed to add sand to coastline in past trials.
   (D) The amount of recent sand buildup on that section of coast is the same as the amount of recent sand buildup on otherwise very similar sections of coast without artificial seaweed.
   (E) The amount of recent sand buildup on that section of coast, although considerable, is not yet enough to replace the amount lost during storms on that section of coast in the last twenty years.

6. Metropolis' regulation limiting to four days the period during which milk can be sold to consumers after pasteurization is unreasonable. Under optimal conditions, pasteurized milk kept at 40 degrees Fahrenheit remains unspoiled for at least 14 days. If Metropolis' current limitation were changed to eight days, milk prices would drop, but product quality would be unaffected.

   Which of the following, if true, would most seriously weaken the conclusion drawn above?

   (A) Most consumers keep milk no more than three days after purchase.
   (B) A recent survey showed that 20 percent of Metropolis consumers favored extending the current limitation on the sale of milk to 8 days.
   (C) Metropolis' grocery-store owners would prefer small, frequent deliveries of milk to larger, infrequent deliveries.
   (D) Milk kept longer than 14 days after pasteurization generally presents no medical dangers if consumed.
   (E) In Metropolis, conditions for handling and storing milk after pasteurization are seldom close to optimum.

GO ON TO THE NEXT PAGE.

Questions 7-10

A commercial grower raises flowers in each of three different growing seasons every year—spring, summer, and fall-winter, with the year beginning in spring. Exactly seven different kinds of flowers—Q, R, S, T, W, X, and Z—are grown every year. Each kind of flower is grown at least once a year. The flowers are grown according to the following rules:

No more than three different kinds of flowers are grown in any one growing season.
No kind of flower can be grown for two growing seasons in a row.
Q can be grown neither in the fall-winter season nor in the same growing season as W or X.
S and T are always grown in the same growing season as each other.
R can be grown in a growing season only if Q was grown in the preceding growing season.

7. Which of the following is an acceptable schedule for the three growing seasons?

	Spring	Summer	Fall-Winter
(A)	Q	S, T, R	Q, X, Z
(B)	S, X	Q, T, Z	R, W
(C)	W, X	Q	Z, S, T, R
(D)	Q, S, T	R, W, X	Z
(E)	S, T, W	Q, Z	Q, X, R

8. If Z and R alone are grown in the fall-winter season, which of the following must be grown in the preceding spring?

(A) Q
(B) R
(C) S
(D) T
(E) W

9. If Z is grown in the spring and W in the summer of one year, which of the following can also be grown in the summer?

(A) Q
(B) S
(C) T
(D) X
(E) Z

10. If there is exactly one of the kinds of flowers that is grown one year during both of two growing seasons, that kind could be

(A) Q
(B) R
(C) S
(D) T
(E) W

GO ON TO THE NEXT PAGE.

Questions 11-13

An operating-room schedule is being set up for Monday and Tuesday of a certain week. On each of the days, either one long and two short operations or else four short operations must be scheduled. For each operation, a surgeon — Chakravarty, Silvers, or Tyson — will be scheduled. Patients to be scheduled will be selected from among patients 1, 2, 3, 4, 5, 6, 7, 8, and 9. The following conditions will be met:

A surgeon cannot be scheduled to perform two consecutive operations on one day.
If a surgeon is scheduled for a long operation, he or she cannot be scheduled for any other operation on the same day.
If a long operation is performed, it must be the first operation scheduled for the day it is performed.
The operations for patients 1 and 3 will be long, and the operations for the other patients will be short.
Patient 1 must be operated on by Dr. Tyson, patients 2 and 4 by Dr. Silvers, and patients 7 and 8 by Dr. Chakravarty.

11. Which of the following could be the schedule of patients from the first to the last patient to be operated on during the two days?

	Monday	Tuesday
(A)	9, 8, 7, 6	1, 2, 5
(B)	1, 9, 5	7, 6
(C)	5, 3, 7	2, 4, 6, 9
(D)	3, 2, 8	4, 6, 9, 7
(E)	1, 8, 7	3, 6, 4

12. If patient 1 is scheduled for the first operation on Monday, the surgeons' schedule for the other operations on Monday, in order of time, could be

(A) Chakravarty, Silvers
(B) Chakravarty, Tyson
(C) Silvers, Tyson
(D) Tyson, Chakravarty
(E) Tyson, Silvers

13. If patients 1 and 2 are among those whose operations are scheduled for Monday, which of the following patients is among those whose operations must be scheduled for Tuesday or not scheduled at all for the two days?

(A) 4
(B) 5
(C) 6
(D) 8
(E) 9

GO ON TO THE NEXT PAGE.

Questions 14-16

Six paintings—F, G, H, J, K, and L—are to be sold at a three-day auction. The paintings are to be divided into three groups—group 1, group 2, and group 3—and each group is to be sold on one of the days of the auction. The paintings to be included in each group are to be selected according to the following conditions:

Group 2 must contain at least as many paintings as group 1, and group 3 must contain at least as many paintings as group 2.

H and K, paintings by the same artist, must be in the same group as each other.

F and L, paintings of similar subjects, must be in different groups from each other.

G and H, estimated to be the two most valuable paintings, must be in different groups from each other.

If J is in group 3, K must also be in group 3 because of a request from the auctioneer for the third day.

14. If H is in group 1, which of the following must be true?

(A) F is in group 2.
(B) G is in group 2.
(C) J is in group 2.
(D) L is in group 2.
(E) L is in group 3.

15. If J is in group 3, which of the following could be in group 2?

(A) F and G
(B) F and L
(C) G and H
(D) H and K
(E) H and L

16. If G is in group 3, which of the following could be true?

(A) F is the only painting in group 1.
(B) J is the only painting in group 1.
(C) J is in group 3.
(D) H and J are in group 2.
(E) J and L are in group 2.

GO ON TO THE NEXT PAGE.

Questions 17-22

Exactly nine books must be arranged from first (leftmost) to ninth (rightmost) on a shelf.

Of the nine books, four are leather-bound books, three are clothbound books, and the remaining two are paperback books.

The four leather-bound books must be next to each other, and the two paperback books must be next to each other.

The three clothbound books do not have to be placed next to each other.

17. If the sixth book is a leather-bound book and the eighth book is a clothbound book, which of the following must be a paperback book?

(A) The first
(B) The second
(C) The third
(D) The fourth
(E) The ninth

18. The clothbound books must be next to each other if a paperback book is in which of the following positions?

(A) The first
(B) The third
(C) The fifth
(D) The seventh
(E) The ninth

19. If the second book is a clothbound book and the third book is a paperback book, which of the following can be a clothbound book?

(A) The fourth
(B) The sixth
(C) The seventh
(D) The eighth
(E) The ninth

20. If no clothbound book is next to another clothbound book, any of the following could be paperback books EXCEPT the

(A) second
(B) third
(C) fifth
(D) seventh
(E) eighth

21. If the first and seventh books have the same kind of binding, which of the following must be a leather-bound book?

(A) The first
(B) The second
(C) The fourth
(D) The sixth
(E) The eighth

22. If a clothbound book is in the fifth position and a leather-bound book is in the ninth position, which of the following pairs of books must have different kinds of binding?

(A) The first and the second
(B) The second and the third
(C) The second and the fourth
(D) The third and the fourth
(E) The third and the fifth

GO ON TO THE NEXT PAGE.

23. Company X recently bought Company Y. Since the two companies had previously been the only companies manufacturing cardboard containers, Company X now has a monopoly in this particular branch of industry and therefore will probably raise the price of its cardboard containers.

Which of the following statements, if true, would most seriously weaken the claim made above?

(A) An increase in the price of cardboard containers would not necessarily increase the retail price of items packed in these containers.
(B) The cost of lumber is a major determinant of the cost of cardboard containers.
(C) There has been a recent increase in demand for cardboard containers.
(D) Manufacturers of cardboard containers face increasingly stiff competition from manufacturers of plastic containers.
(E) Before Company X bought Company Y, Company X had consistently set the prices of its cardboard containers below the prices set by Company Y.

24. Chlorofluorocarbons (CFC's) pose known dangers to public health. Only when the United States government imposes a specific ban on the industrial use of CFC's will industry scientists make the alternatives to CFC's cost-effective, and thus reduce public health hazards.

Which of the following is an assumption on which the assertion made above is based?

(A) The alternatives to CFC's currently available are not widely used because they are not familiar to a sufficient number of industry scientists.
(B) The alternatives to CFC's are less hazardous to public health than are CFC's.
(C) Private industry has a responsibility to take voluntary measures to safeguard public health and absorb the costs of such measures.
(D) The use of CFC's can result in employee time lost because of illness.
(E) CFC's are currently the most serious public health hazard engendered by industry in the United States.

25. Lobsters usually develop one smaller, cutter claw and one larger, crusher claw. To show that exercise determines which claw becomes the crusher, researchers placed young lobsters in tanks and repeatedly prompted them to grab a probe with one claw—in each case always the same, randomly selected claw. In most of the lobsters the grabbing claw became the crusher. But in a second, similar experiment, when lobsters were prompted to use both claws equally for grabbing, most matured with two cutter claws, even though each claw was exercised as much as the grabbing claws had been in the first experiment.

Which of the following is best supported by the information above?

(A) Young lobsters usually exercise one claw more than the other.
(B) Most lobsters raised in captivity will not develop a crusher claw.
(C) Exercise is not a determining factor in the development of crusher claws in lobsters.
(D) Cutter claws are more effective for grabbing than are crusher claws.
(E) Young lobsters that do not exercise either claw will nevertheless usually develop one crusher and one cutter claw.

SECTION 2

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

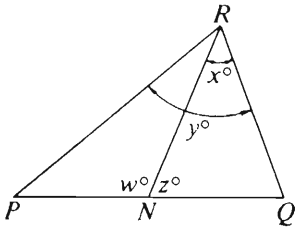
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



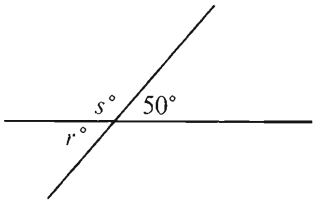
Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	m is equal to 8 or -2.	
1.	$(m - 3)^2$	25

	Column A	Column B
	x and y are each greater than 1.	
2.	$2xy$	$(2x)(2y)$



3.	$3r$	s
4.	$(-2)^8$	$-(2^8)$

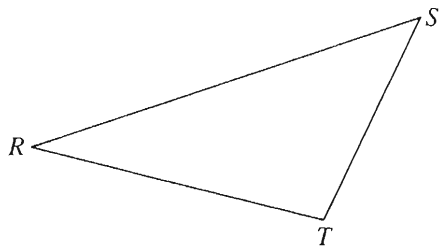
A decrease in the number of sales personnel in Company K to 85 percent of the original sales force resulted in a decrease of 500 in the number of monthly sales.

5.	The percent decrease in the number of Company K's monthly sales	The percent decrease in the number of Company K's sales personnel

	Column A	Column B
6.	$1 - \frac{1}{7}$	$1 - \frac{1}{8}$

Jim is 3 years older than Jonathon.
Myra is 5 years older than Melissa.
Jonathon is 2 years older than Melissa.

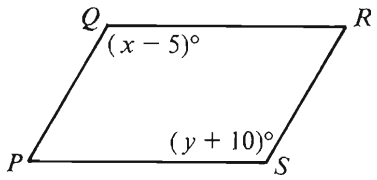
7.	Jim's age	Myra's age



8.	$ST + TR$	RS

$750 < n < 1{,}500$

9.	$1{,}500 - n$	$n - 750$



$PQRS$ is a parallelogram.

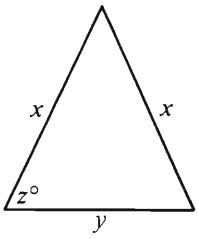
10.	x	y

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

$$\frac{x + 2y + z}{2} = y$$

	Column A	Column B
11.	x	$-z$



$x > y$

	Column A	Column B
12.	z	60
13.	$(x + 3)(x + 3)$	$x^2 + 9$

	Column A	Column B
		

Three tennis balls of identical size are stacked one on top of the other so that they fit exactly inside a closed right cylindrical can, as shown.

	Column A	Column B
14.	The height of the stack of 3 balls	The circumference of one of the balls

t is an integer.

	Column A	Column B
15.	$\frac{1}{1 + 2^t}$	$\frac{1}{1 + 3^t}$

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. If $\frac{1}{6}n = \frac{1}{5}$, then $n =$

(A) $\frac{1}{30}$

(B) $\frac{5}{6}$

(C) $\frac{6}{5}$

(D) 6

(E) 30

17. If membership in the Elks Club increases from 120 to 150, what is the percent increase?

(A) 15%
(B) 25%
(C) 30%
(D) 40%
(E) 80%

18. The value of $\left(1 - \frac{5}{7}\right)\left(1 + \frac{3}{4}\right)$ is

(A) $\frac{1}{28}$

(B) $\frac{3}{14}$

(C) $\frac{9}{28}$

(D) $\frac{13}{28}$

(E) $\frac{1}{2}$

19. If the circumference of a circle is less than 10π, which of the following could be the area of the circle?

(A) 20π
(B) 25π
(C) 36π
(D) 81π
(E) 100π

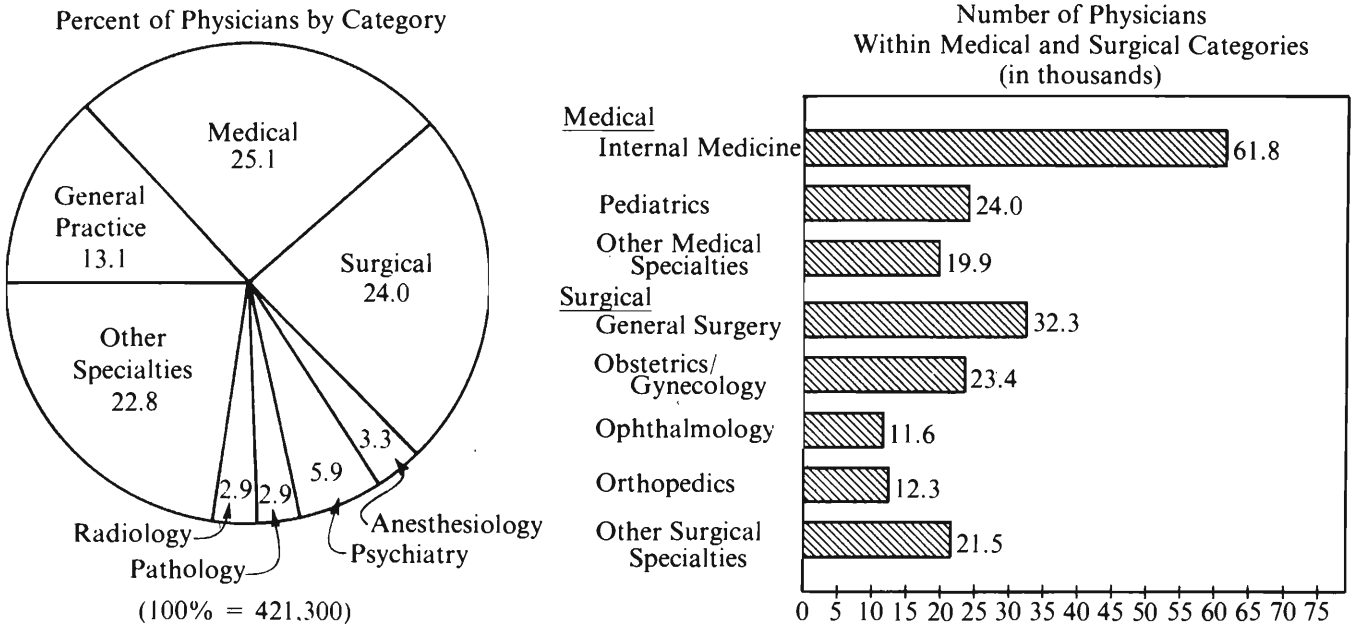
20. If a, b, and c are consecutive positive integers and $a < b < c$, which of the following must be an odd integer?

(A) abc
(B) $a + b + c$
(C) $a + bc$
(D) $a(b + c)$
(E) $(a + b)(b + c)$

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graphs.

PHYSICIANS CLASSIFIED BY CATEGORY IN 1977



21. Approximately what was the ratio of physicians in the surgical category to physicians in pathology?

(A) 10 to 1
(B) 8 to 1
(C) 7 to 1
(D) 5 to 6
(E) 4 to 5

22. Approximately how many more physicians were in psychiatry than in radiology?

(A) 3,000
(B) 6,300
(C) 12,600
(D) 24,800
(E) 37,000

23. Approximately how many of the physicians in the medical category were not in pediatrics?

(A) 61,800
(B) 76,000
(C) 81,700
(D) 92,600
(E) 101,100

24. If there was a total of 334,000 physicians in 1970, what was the approximate percent increase in the number of physicians from 1970 to 1977 ?

(A) 10%
(B) 12%
(C) 16%
(D) 20%
(E) 26%

25. In 1977, if twice as many anesthesiologists as orthopedists were sued for malpractice and 10 percent of the orthopedists were sued, approximately what percent of the anesthesiologists were sued?

(A) 5%
(B) 9%
(C) 18%
(D) 22%
(E) 25%

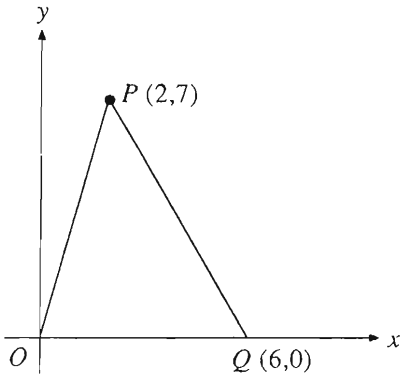
GO ON TO THE NEXT PAGE.

26. If x can have only the values -3, 0, and 2, and y can have only the values -4, 2, and 3, what is the greatest possible value for $2x + y^2$?

(A) 13
(B) 15
(C) 16
(D) 20
(E) 22

27. If B is the midpoint of line segment AD and C is the midpoint of line segment BD, what is the value of $\frac{AB}{AC}$?

(A) $\frac{3}{4}$
(B) $\frac{2}{3}$
(C) $\frac{1}{2}$
(D) $\frac{1}{3}$
(E) $\frac{1}{4}$



28. The area of $\triangle OPQ$ in the figure above is

(A) 6
(B) 12
(C) 14
(D) 21
(E) 42

29. What is the greatest positive integer n such that 2^n is a factor of 12^{10}?

(A) 10
(B) 12
(C) 16
(D) 20
(E) 60

30. For each of n people, Margie bought a hamburger and a soda at a restaurant. For each of n people, Paul bought 3 hamburgers and a soda at the same restaurant. If Margie spent a total of \$5.40 and Paul spent a total of \$12.60, how much did Paul spend just for hamburgers? (Assume that all hamburgers cost the same and all sodas cost the same.)

(A) \$10.80
(B) \$9.60
(C) \$7.20
(D) \$3.60
(E) \$2.40

SECTION 3

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Although economists have traditionally considered the district to be solely an agricultural one, the ------- of the inhabitants' occupations makes such a classification obsolete.

   (A) productivity (B) diversity (C) predictability (D) profitability (E) stability

2. The author of this book ------- overlooks or minimizes some of the problems and shortcomings in otherwise highly successful foreign industries in order to ------- the points on which they excel and on which we might try to emulate them.

   (A) accidentally. .exaggerate
   (B) purposely. .emphasize
   (C) occasionally. .counterbalance
   (D) intentionally. .confuse
   (E) cleverly. .compound

3. Crosby's colleagues have never learned, at least not in time to avoid embarrassing themselves, that her occasional ------- air of befuddlement ------- a display of her formidable intelligence.

   (A) genuine. .dominates (B) alert. .contradicts (C) acute. .precludes (D) bogus. .presages (E) painstaking. .succeeds

4. To ensure the development and exploitation of a new technology, there must be a constant ------- of several nevertheless distinct activities.

   (A) interplay (B) implementation (C) comprehending (D) improvement (E) exploration

5. Some customs travel well; often, however, behavior that is considered the epitome of ------- at home is perceived as impossibly rude or, at the least, harmlessly bizarre abroad.

   (A) novelty (B) eccentricity (C) urbanity (D) coarseness (E) tolerance

6. The ------- of the early Greek philosophers' attempts to explain the operations of the cosmos led certain later thinkers to inquire into the ------- of human reason.

   (A) difficulty. .origin
   (B) meaning. .supremacy
   (C) complexity. .reality
   (D) equivocations. .subtlety
   (E) failures. .efficacy

7. Ever prey to vagrant impulses that impelled him to ------- his talents on a host of unworthy projects, his very -------- nonetheless enhanced his reputation, for the sheer energy of his extravagance dazzled observers.

   (A) undermine. .enthusiasm
   (B) isolate. .selectiveness
   (C) display. .affability
   (D) squander. .dissipation
   (E) implicate. .genius

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. MULTIPLY : DIVIDE ::
   (A) enumerate : count
   (B) speak : communicate
   (C) enter : leave
   (D) drive : ride
   (E) compute : estimate

9. RECLUSE : WITHDRAWN ::
   (A) isolationist : unreserved
   (B) pacifist : aggressive
   (C) miser : liberal
   (D) bigot : biased
   (E) procrastinator : unmanageable

10. CURATOR : ART ::
   (A) functionary : administration
   (B) archivist : documents
   (C) referee : laws
   (D) physician : research
   (E) raconteur : stories

11. ABACUS : CALCULATE ::
   (A) organ : worship
   (B) patent : invent
   (C) calipers : regulate
   (D) manuscript : edit
   (E) sextant : navigate

12. STRAY : GROUP ::
   (A) miscalculate : solution
   (B) improvise : suggestion
   (C) slur : pronunciation
   (D) delete : change
   (E) digress : subject

13. ESCAPE : CAPTURE ::
   (A) warn : danger
   (B) immerse : dampness
   (C) feint : thrust
   (D) dodge : blow
   (E) invest : bankruptcy

14. LEVEE : RIVER ::
   (A) seam : fabric
   (B) corona : sun
   (C) cordon : crowd
   (D) petal : flower
   (E) moat : castle

15. MERCURIAL : MOOD ::
   (A) energetic : delirium
   (B) jovial : conviviality
   (C) fickle : affection
   (D) martial : anarchy
   (E) paranoid : suspicion

16. ENUNCIATE : WORDS ::
   (A) limn : lines
   (B) parse : sentences
   (C) hear : sounds
   (D) run : steps
   (E) stint : savings

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Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

A serious critic has to comprehend the particular content, unique structure, and special meaning of a work of art. And here she faces a dilemma. The critic must recognize the artistic element of uniqueness that requires subjective reaction; yet she must not be unduly prejudiced by such reactions. Her likes and dislikes are less important than what the work itself communicates, and her preferences may blind her to certain qualities of the work and thereby prevent an adequate understanding of it. Hence, it is necessary that a critic develop a sensibility informed by familiarity with the history of art and aesthetic theory. On the other hand, it is insufficient to treat the artwork solely historically, in relation to a fixed set of ideas or values. The critic's knowledge and training are, rather, a preparation of the cognitive and emotional abilities needed for an adequate personal response to an artwork's own particular qualities.

17. According to the author, a serious art critic may avoid being prejudiced by her subjective reactions if she

(A) treats an artwork in relation to a fixed set of ideas and values
(B) brings to her observation a knowledge of art history and aesthetic theory
(C) allows more time for the observation of each artwork
(D) takes into account the preferences of other art critics
(E) limits herself to that art with which she has adequate familiarity

18. The author implies that it is insufficient to treat a work of art solely historically because

(A) doing so would lead the critic into a dilemma
(B) doing so can blind the critic to some of the artwork's unique qualities
(C) doing so can insulate the critic from personally held beliefs
(D) subjective reactions can produce a biased response
(E) critics are not sufficiently familiar with art history

19. The passage suggests that the author would be most likely to agree with which of the following statements?

(A) Art speaks to the passions as well as to the intellect.
(B) Most works of art express unconscious wishes or desires.
(C) The best art is accessible to the greatest number of people.
(D) The art produced in the last few decades is of inferior quality.
(E) The meaning of art is a function of the social conditions in which it was produced.

20. The author's argument is developed primarily by the use of

(A) an attack on sentimentality
(B) an example of successful art criticism
(C) a critique of artists' training
(D) a warning against extremes in art criticism
(E) an analogy between art criticism and art production

GO ON TO THE NEXT PAGE.

Viruses, infectious particles consisting of nucleic acid packaged in a protein coat (the capsid), are difficult to resist. Unable to reproduce outside a living cell, viruses reproduce only by subverting the genetic mechanisms of a host cell. In one kind of viral life cycle, the virus first binds to the cell's surface, then penetrates the cell and sheds its capsid. The exposed viral nucleic acid produces new viruses from the contents of the cell. Finally, the cell releases the viral progeny, and a new cell cycle of infection begins. The human body responds to a viral infection by producing antibodies: complex, highly specific proteins that selectively bind to foreign molecules such as viruses. An antibody can either interfere with a virus' ability to bind to a cell, or can prevent it from releasing its nucleic acid.

Unfortunately, the common cold, produced most often by rhinoviruses, is intractable to antiviral defense. Humans have difficulty resisting colds because rhinoviruses are so diverse, including at least 100 strains. The strains differ most in the molecular structure of the proteins in their capsids. Since disease-fighting antibodies bind to the capsid, an antibody developed to protect against one rhinovirus strain is useless against other strains. Different antibodies must be produced for each strain.

A defense against rhinoviruses might nonetheless succeed by exploiting hidden similarities among the rhinovirus strains. For example, most rhinovirus strains bind to the same kind of molecule (delta-receptors) on a cell's surface when they attack human cells. Colonno, taking advantage of these common receptors, devised a strategy for blocking the attachment of rhinoviruses to their appropriate receptors. Rather than fruitlessly searching for an antibody that would bind to all rhinoviruses, Colonno realized that an antibody binding to the common receptors of a human cell would prevent rhinoviruses from initiating an infection. Because human cells normally do not develop antibodies to components of their own cells, Colonno injected human cells into mice, which did produce an antibody to the common receptor. In isolated human cells, this antibody proved to be extraordinarily effective at thwarting the rhinovirus. Moreover, when the antibody was given to chimpanzees, it inhibited rhinoviral growth, and in humans it lessened both the severity and duration of cold symptoms.

Another possible defense against rhinoviruses was proposed by Rossman, who described rhinoviruses' detailed molecular structure. Rossman showed that protein sequences common to all rhinovirus strains lie at the base of a deep "canyon" scoring each face of the capsid. The narrow opening of this canyon possibly prevents the relatively large antibody molecules from binding to the common sequence, but smaller molecules might reach it. Among these smaller, nonantibody molecules, some might bind to the common sequence, lock the nucleic acid in its coat, and thereby prevent the virus from reproducing.

21. The primary purpose of the passage is to

(A) discuss viral mechanisms and possible ways of circumventing certain kinds of those mechanisms
(B) challenge recent research on how rhinoviruses bind to receptors on the surfaces of cells
(C) suggest future research on rhinoviral growth in chimpanzees
(D) defend a controversial research program whose purpose is to discover the molecular structure of rhinovirus capsids
(E) evaluate a dispute between advocates of two theories about the rhinovirus life cycle

22. It can be inferred from the passage that the protein sequences of the capsid that vary most among strains of rhinovirus are those

(A) at the base of the "canyon"
(B) outside of the "canyon"
(C) responsible for producing nucleic acid
(D) responsible for preventing the formation of delta-receptors
(E) preventing the capsid from releasing its nucleic acid

23. It can be inferred from the passage that a cell lacking delta-receptors will be

(A) unable to prevent the rhinoviral nucleic acid from shedding its capsid
(B) defenseless against most strains of rhinovirus
(C) unable to release the viral progeny it develops after infection
(D) protected from new infections by antibodies to the rhinovirus
(E) resistant to infection by most strains of rhinovirus

24. Which of the following research strategies for developing a defense against the common cold would the author be likely to find most promising?

(A) Continuing to look for a general antirhinoviral antibody
(B) Searching for common cell-surface receptors in humans and mice
(C) Continuing to look for similarities among the various strains of rhinovirus
(D) Discovering how the human body produces antibodies in response to a rhinoviral infection
(E) Determining the detailed molecular structure of the nucleic acid of a rhinovirus

GO ON TO THE NEXT PAGE.

25. It can be inferred from the passage that the purpose of Colonno's experiments was to determine whether

(A) chimpanzees and humans can both be infected by rhinoviruses
(B) chimpanzees can produce antibodies to human cell-surface receptors
(C) a rhinovirus' nucleic acid might be locked in its protein coat
(D) binding antibodies to common receptors could produce a possible defense against rhinoviruses
(E) rhinoviruses are vulnerable to human antibodies

26. According to the passage, Rossman's research suggests that

(A) a defense against rhinoviruses might exploit structural similarities among the strains of rhinovirus
(B) human cells normally do not develop antibodies to components of their own cells
(C) the various strains of rhinovirus differ in their ability to bind to the surface of a host cell
(D) rhinovirus versatility can work to the benefit of researchers trying to find a useful antibody
(E) Colonno's research findings are probably invalid

27. According to the passage, in order for a given antibody to bind to a given rhinoviral capsid, which of the following must be true?

(A) The capsid must have a deep "canyon" on each of its faces.
(B) The antibody must be specific to the molecular structure of the particular capsid.
(C) The capsid must separate from its nucleic acid before binding to an antibody.
(D) The antibody must bind to a particular cell-surface receptor before it can bind to a rhinovirus.
(E) The antibody must first enter a cell containing the particular rhinovirus.

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. DOMINANT: (A) defective (B) multiple (C) inferred (D) shifting (E) recessive

29. DISPUTE: (A) accept (B) simplify (C) frustrate (D) silence (E) understand

30. PERJURY:
(A) truthful deposition
(B) vivid recollection
(C) voluntary testimony
(D) inadvertent disclosure
(E) inexplicable fabrication

31. DORMANCY: (A) momentum (B) hysteria (C) availability (D) activity (E) cultivation

32. PLETHORA: (A) deterioration (B) embellishment (C) scarcity (D) vacillation (E) affirmation

33. STOCK: (A) unique (B) unfounded (C) desirable (D) unhealthy (E) trustworthy

34. BURGEON: (A) retreat (B) evolve (C) wither (D) sever (E) minimize

35. OCCULT: (A) foresee (B) bare (C) assert (D) transform (E) presume

36. NASCENT: (A) widely displaced (B) completely clear (C) totally natural (D) strongly contrary (E) fully established

37. AMPLIFY: (A) condemn (B) disburse (C) decipher (D) garble (E) abridge

38. EXTENUATING: (A) opposing (B) severe (C) intractable (D) aggravating (E) internal

SECTION 4

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

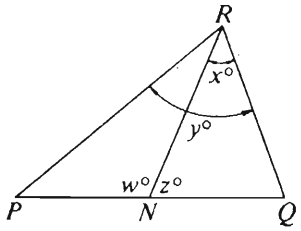
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

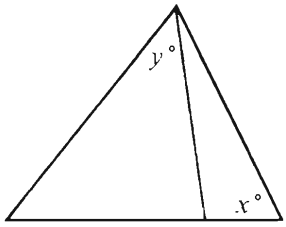
GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	$\frac{4}{5} + \frac{2}{11}$	1
2.	$(1.9)^3$	$(1.999)^2$

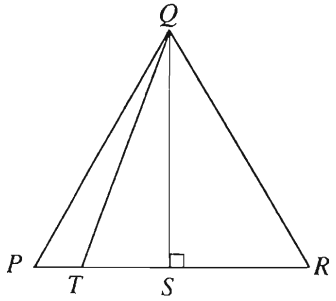
The numbers that correspond to points X and Y on the number line are $-\frac{3}{4}$ and $\frac{5}{4}$, respectively.

3.	The number that corresponds to the point halfway between X and Y	$\frac{1}{3}$



4.	x	y
5.	$7\frac{1}{5}$	7.02

	Column A	Column B
6.	$\frac{y}{2}$	$\frac{x + y}{2}$



S is the midpoint of segment PR.

7.	The length of segment QT	The length of segment QR

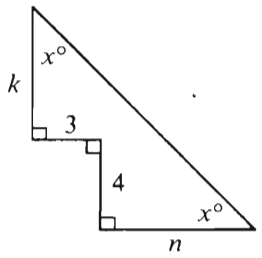
A merchant made a profit of \$2.75 on the sale price of a sweater that cost the merchant \$12.25.

8.	The profit expressed as a percent of the cost to the merchant	The profit expressed as a percent of the sale price

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
9.	k	n

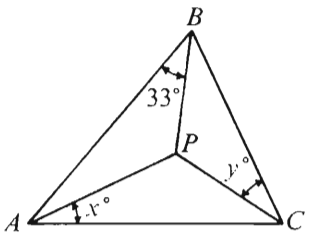


A student has test scores of 85, x, and y, respectively, and an average (arithmetic mean) score of 95 on the three tests.

	Column A	Column B
10.	The average (arithmetic mean) of x and y	100

$$y^2 + 4y - 12 = 0$$

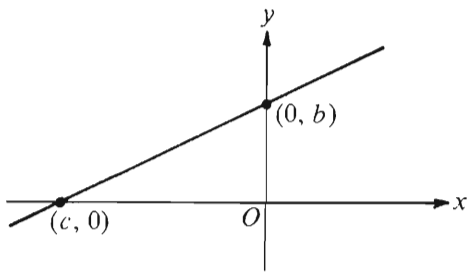
	Column A	Column B
11.	y^2	30



Segments PA, PB, and PC are the angle bisectors of $\triangle ABC$.

	Column A	Column B
12.	$x + y$	57

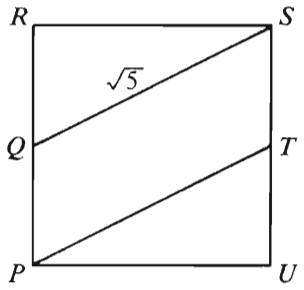
	Column A	Column B
13.	a	$\frac{b}{-c}$



The line $y = ax + b$ is graphed on the rectangular coordinate axes.

For all numbers n, $n^* = 32 - n$.

	Column A	Column B
14.	$(n^*)^*$	n



Q and T are the midpoints of opposite sides of square $PRSU$.

	Column A	Column B
15.	The area of region $PQST$	$\frac{3}{2}$

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. If a certain company purchased its computer terminals for a total of \$540,400 and each of the terminals was purchased for \$350, how many terminals did the company purchase?

(A) 1,624
(B) 1,544
(C) 1,434
(D) 1,384
(E) 1,264

17. $$\frac{\frac{2}{3} \times 9 \times \frac{2}{5} \times 15}{\frac{1}{3} \times 18 \times \frac{1}{5} \times 30} =$$

(A) 2

(B) 1

(C) $\frac{1}{2}$

(D) $\frac{1}{3}$

(E) $\frac{1}{4}$

18. If $2x = -10$, then $4x^2 - 6x - 5 =$

(A) 65
(B) 75
(C) 125
(D) 130
(E) 135

19. If $3 < x < 8$ and $5 < y < 11$, which of the following represents all the possible values of xy?

(A) $3 < xy < 11$
(B) $8 < xy < 19$
(C) $15 < xy < 88$
(D) $24 < xy < 55$
(E) $33 < xy < 40$

20. Chris gave Jane x cards. He gave Betty one card more than he gave Jane and he gave Paul two cards fewer than he gave Betty. In terms of x, how many cards did Chris give Betty, Jane, and Paul altogether?

(A) $3x + 1$

(B) $3x$

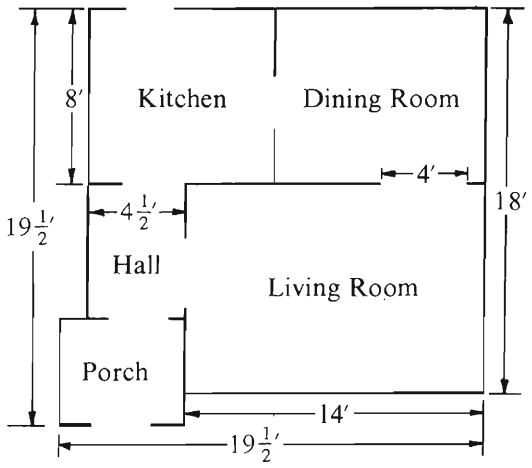
(C) $3x - 1$

(D) $x - 1$

(E) $\frac{x}{3}$

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following floor plan.



Front

Note: Figure drawn to scale.

The figure above shows the plan for the ground floor of a house. The thickness of the walls should be ignored in answering the questions. The dimensions are in feet, and each region is rectangular.

21. What is the area, in square feet, of the living room?

(A) 161
(B) 140
(C) 133
(D) 126
(E) 115

22. If the ceilings and walls of the living room, dining room, kitchen, and hall are to be painted, how many square feet must be painted?

(A) $231\frac{1}{4}$
(B) 324
(C) 333
(D) $380\frac{1}{4}$
(E) It cannot be determined from the information given.

23. If the hall is $6\frac{1}{2}$ feet long, what is the perimeter, in feet, of the porch area?

(A) 18
(B) 19
(C) 20
(D) 21
(E) 22

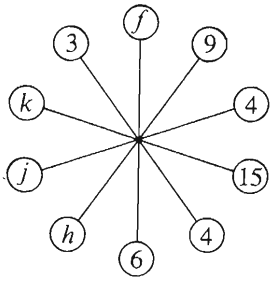
24. How many more feet does the porch extend in front of the house than it does beyond the side of the house?

(A) $\frac{1}{2}$
(B) 1
(C) $1\frac{1}{2}$
(D) 2
(E) It cannot be determined from the information given.

25. If the kitchen is square, what is the ratio of the area of the kitchen to the area of the dining room?

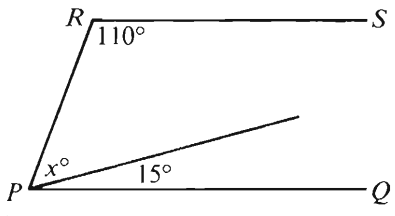
(A) $\frac{16}{37}$
(B) $\frac{3}{7}$
(C) $\frac{4}{7}$
(D) $\frac{8}{11}$
(E) $\frac{16}{21}$

GO ON TO THE NEXT PAGE.



26. In the figure above, the product of any two numbers in adjacent circles is equal to the product of the two numbers that are opposite those circles. For example, $3 \cdot f = 4 \cdot 6$. What is the value of j?

(A) 3
(B) 4
(C) 6
(D) 12
(E) 20



27. In the figure above, if $PQ \parallel RS$, then $x =$

(A) 95
(B) 85
(C) 75
(D) 65
(E) 55

28. If $x \neq 0$, then $\frac{x + 7}{7x} - \frac{1}{x} =$

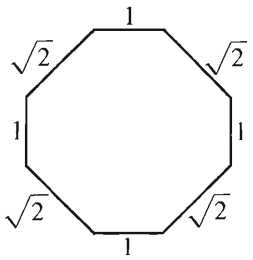
(A) $\frac{x + 6}{6x}$

(B) $\frac{x + 6}{7x}$

(C) $\frac{-6x + 7}{7x}$

(D) $\frac{1}{7}$

(E) $-\frac{1}{7}$



29. The figure above shows the lengths of the sides of an equiangular polygon. What is the area of the polygon?

(A) 7
(B) 8
(C) 9
(D) $14\sqrt{2}$
(E) It cannot be determined from the information given.

30. A certain recipe makes enough batter for exactly 8 circular pancakes that are each 10 inches in diameter. How many circular pancakes, each 5 inches in diameter and of the same thickness as the 10-inch pancakes, should the recipe make?

(A) 4
(B) 16
(C) 24
(D) 32
(E) 40

SECTION 5
Time—30 minutes
25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-5

Seven dignitaries—F, G, H, I, N, O, and P—are to be seated together at a diplomatic ceremony. They will be seated in a row of seven chairs, numbered from 1 to 7, from front to back. Any seating is acceptable as long as all seven dignitaries are seated, one in each chair, and the seating conforms to the following rules:

F must sit in the chair immediately behind O's chair.
G cannot sit in the chair immediately in front of N's chair, and G cannot sit in the chair immediately behind N's chair.
There must be exactly two chairs between the chairs of H and P.
There must be at least one chair between the chairs of I and P.
N must sit in chair 3.

1. Which of the following seating arrangements, from chair 1 through chair 7, conforms to the rules?

(A) F, I, N, P, G, O, H
(B) G, P, N, I, H, O, F
(C) I, G, N, P, O, F, H
(D) I, H, N, P, O, F, G
(E) O, F, H, N, I, P, G

2. If F sits in chair 6 and H sits in chair 7, which of the following dignitaries must sit in chair 2 ?

(A) G
(B) I
(C) N
(D) O
(E) P

3. If the seating arrangement, from chair 1 through chair 7, is G, I, N, H, O, F, P, which of the following pairs of dignitaries can exchange seats without violating the rules?

(A) F and G
(B) G and H
(C) G and I
(D) H and P
(E) I and P

4. If O sits in chair 1 and H sits in chair 7, then the number of chairs between F's chair and I's chair must be

(A) zero
(B) one
(C) two
(D) three
(E) four

5. If H sits in chair 4 and F sits in chair 6, then the dignitaries in chairs 1 and 7, respectively, must be

(A) G and O
(B) G and P
(C) I and P
(D) O and I
(E) P and O

GO ON TO THE NEXT PAGE.

6. A judicial order of a few years ago was intended to foster competition in the telephone industry; it was thought that competition would lead to savings for consumers. Long-distance calls made during the day are now cheaper than they were before the order, but the average residential user's charges for long-distance calls have risen by 25 percent.

   Which of the following, if true, would most directly explain the higher long-distance charges incurred by residential users?

   (A) More long-distance calls are made by businesses than by residential users.
   (B) Telephone companies are expanding their services in the areas of computing and data processing.
   (C) Rates for calls made during the evening, the time when most residential users make long-distance calls, have increased.
   (D) Increased competition has led telephone companies to expand their budgets for the development of new technology.
   (E) Telephone companies must receive approval from regulatory agencies before putting rate changes into effect.

7. A program of steady, moderate aerobic exercise coupled with a diet low in saturated fats and cholesterol has been associated with reduced risk of heart attacks and strokes. Therefore, no one who exercises regularly and eats only foods that are low in saturated fats and cholesterol will have a heart attack or stroke.

   Of the following, the best criticism of the argument above is that the argument does not

   (A) take into account the possibility of heart attacks and strokes that occur regardless of diet and level of exercise
   (B) take into account all of the possible physiological effects of saturated fats and cholesterol
   (C) specify whether foods high in saturated fats also contain cholesterol
   (D) indicate whether an increased risk of heart attacks and strokes is due more to poor diet or more to lack of exercise
   (E) differentiate between the causes of heart attacks and the causes of strokes

8. The number of boats sold in 1973 was greater than the number of boats sold in 1987. However, more money was spent buying boats in 1987 than was spent buying boats in 1973.

   Which of the following statements can be properly inferred from the statements above?

   (A) In 1973 the demand for boats exceeded the supply, while in 1987 the supply of boats exceeded the demand.
   (B) People were willing to invest a greater proportion of their income in boats in 1987 than they were in 1973.
   (C) Between 1973 and 1987, there was a gradual increase in the proportion of large and luxuriously equipped boats sold.
   (D) The average (mean) price of boats sold in 1973 was less than that of boats sold in 1987.
   (E) Between 1973 and 1987, the number of new boats being made increased.

GO ON TO THE NEXT PAGE.

Questions 9-12

The following are the nine options that are available for the Sleuth, a certain make of automobile: air conditioning, power brakes, power steering, power windows, a heavy-duty engine, heavy-duty shock absorbers, a hatchback, a sunroof, a tinted windshield. Because of certain manufacturing and safety considerations, the purchase of these options must conform to the following conditions:

If air conditioning is chosen, a heavy-duty engine, heavy-duty shock absorbers, and a tinted windshield are also required.
If any of the power-assisted options (power brakes, power steering, power windows) are chosen, a heavy-duty engine is also required.
If a heavy-duty engine is chosen, power brakes are also required.
If a hatchback is chosen, a sunroof cannot be chosen.
A tinted windshield can be chosen only for an automobile for which either a sunroof or air conditioning or both are chosen.

9. Of the following, which could be a completed selection of optional equipment that conforms to the conditions?

(A) Power steering, a sunroof
(B) A hatchback, a sunroof, a tinted windshield
(C) Power brakes, power steering, a heavy-duty engine, heavy-duty shock absorbers, a hatchback
(D) Air conditioning, power brakes, a heavy-duty engine, a hatchback, a tinted windshield
(E) Air conditioning, power brakes, a heavy-duty engine, heavy-duty shock absorbers, a hatchback

10. Which of the following must be true?

(A) A Sleuth equipped with air conditioning must also be equipped with power brakes.
(B) A Sleuth equipped with a tinted windshield must also be equipped with a heavy-duty engine.
(C) A Sleuth equipped with power brakes must also be equipped with power steering.
(D) A Sleuth equipped with air conditioning must also be equipped with a sunroof.
(E) A Sleuth equipped with a sunroof must also be equipped with a tinted windshield.

11. Which of the following options can be chosen without the purchase of additional options?

(A) Heavy-duty shock absorbers
(B) Power windows
(C) Power brakes
(D) A heavy-duty engine
(E) A tinted windshield

12. A buyer who does not want air conditioning but otherwise wants the maximum number of options for a Sleuth CANNOT purchase

(A) power steering
(B) power brakes
(C) power windows
(D) a tinted windshield
(E) a hatchback

GO ON TO THE NEXT PAGE.

Questions 13-18

The art director of an advertising company is preparing a sales brochure for a boat-manufacturing company. To represent her client's line of products, she wants a separate full-page color advertisement in the brochure for each of the following five types of boats: kayak, motorboat, pedal boat, raft, and sailboat. Thus, there will be exactly five printed pages, numbered consecutively one through five, in the brochure. Because she also wants to show the range of colors that the manufacturer uses, one of the boats pictured must be green, one must be orange, one must be tan, one must be white, and one must be yellow. In designing the brochure, she has made the following decisions:

The motorboat will be advertised on a lower-numbered page than the pedal boat.
The sailboat will be advertised on a lower-numbered page than the kayak.
The white boat will be advertised on a lower-numbered page than the yellow boat.
The orange boat will be advertised on page three.
The pedal boat advertised will be tan.

13. Which of the following could be the colors of the boats advertised on pages 1 through 5, respectively?

(A) White, tan, orange, green, yellow
(B) Green, orange, white, yellow, tan
(C) Green, tan, orange, yellow, white
(D) Orange, yellow, white, tan, green
(E) Tan, yellow, orange, green, white

14. Any of the boats could be advertised on page 3 EXCEPT the

(A) kayak
(B) motorboat
(C) pedal boat
(D) raft
(E) sailboat

15. If the kayak is advertised on a lower-numbered page than the orange boat, which of the following must be true?

(A) The kayak is advertised on page 1.
(B) The motorboat is advertised on page 2.
(C) The pedal boat is advertised on page 5.
(D) The raft is advertised on page 3.
(E) The sailboat is advertised on page 1.

16. If the kayak is green, the boat advertised on page 1 must be

(A) green
(B) orange
(C) tan
(D) white
(E) yellow

17. If the motorboat is green and is advertised on page 4, which of the following must be true?

(A) The kayak is advertised on page 2.
(B) The raft is advertised on page 3.
(C) The sailboat is advertised on page 1.
(D) The white boat is advertised on page 1.
(E) The tan boat is advertised on page 2.

18. If the sailboat is advertised on page 2 and the green boat is advertised on page 5, the sailboat must be

(A) green
(B) orange
(C) tan
(D) white
(E) yellow

GO ON TO THE NEXT PAGE.

Questions 19-22

On each weekday evening, Monday through Friday, for one week, a financial consulting firm is offering a class on investments. A pair of exactly two instructors—one experienced and one inexperienced—will be chosen to teach each evening. The available experienced instructors are Salazar, Tang, and Uhl. The available inexperienced instructors are Vine, Wolfe, Xavier, Yamashita, and Ziegler. Instructors will be assigned to teach classes according to the following conditions:

No instructor can be assigned to teach classes on two consecutive evenings.
Salazar and Xavier, if either is assigned to teach, must always be assigned as a pair.
Vine must be assigned to teach Wednesday's class.
Yamashita cannot be assigned to teach a class on an evening immediately preceding or following an evening when Ziegler is assigned to teach.

19. Which of the following can be the pair of instructors assigned to teach Tuesday's class?

(A) Salazar and Ziegler
(B) Tang and Uhl
(C) Tang and Yamashita
(D) Uhl and Xavier
(E) Wolfe and Yamashita

20. If Tang and Ziegler are assigned to teach Monday's class, which of the following pairs of instructors can be assigned to teach Tuesday's class?

(A) Salazar and Wolfe
(B) Salazar and Xavier
(C) Tang and Wolfe
(D) Uhl and Vine
(E) Uhl and Yamashita

21. If exactly two of the inexperienced instructors are assigned to teach classes during the week, which of the following must be true?

(A) Salazar is assigned to teach exactly two classes.
(B) Tang is assigned to teach exactly two classes.
(C) Uhl is assigned to teach exactly three classes.
(D) Vine is assigned to teach exactly three classes.
(E) Xavier is assigned to teach exactly one class.

22. If Uhl is assigned to teach exactly one class, which is on Tuesday, which of the following is one of the instructors who must be assigned to teach Thursday's class?

(A) Salazar
(B) Tang
(C) Wolfe
(D) Yamashita
(E) Ziegler

GO ON TO THE NEXT PAGE.

23. In the 1950's sixty percent of treated cancer patients lived at least five years after detection of the disease. Now, sixty percent live at least seven years after detection. This fact demonstrates that, because of improved methods of treatment, cancer patients now live longer after they contract the disease than cancer patients did in the 1950's.

The conclusion of the argument above depends on which of the following assumptions?

(A) In the 1950's only sixty percent of cancer patients received treatment, whereas now a substantially higher percentage does.
(B) Free medical treatment is more likely to be available now to people who have no health insurance than it was in the 1950's.
(C) Detection of cancer does not now take place, on average, significantly earlier in the progression of the disease than it did in the 1950's.
(D) Physicians now usually predict a longer life for cancer patients after detection of the disease than did physicians in the 1950's.
(E) The number of cancer patients now is approximately the same as it was in the 1950's.

24. The large amounts of carbon dioxide now being released into the atmosphere by the burning of fossil fuels will not, in fact, result in a greenhouse effect—an increase in average global temperatures. Since plants use carbon dioxide in larger quantities if the supply is increased, they are able to grow larger and multiply more vigorously, and atmospheric carbon dioxide concentrations will eventually become stable.

Which of the following, if true, would most seriously weaken the conclusion that a greenhouse effect will not result from the current release of large amounts of carbon dioxide into the atmosphere?

(A) The expected rise in average global temperatures has not yet been observed.
(B) Ocean waters absorb carbon dioxide at a greater rate when the atmospheric concentration of carbon dioxide is higher.
(C) Since the beginning of the Industrial Revolution, increased atmospheric concentrations of carbon dioxide have resulted in improved agricultural productivity.
(D) When plants decay, they produce methane, another gas that can have a marked greenhouse effect.
(E) The fact that carbon dioxide levels have risen and fallen many times in the Earth's history suggests that there is some biological process that can reverse the greenhouse effect.

25. The number of people 85 or older in the United States started increasing dramatically during the last ten years. The good health care that these people enjoyed in the United States during their vulnerable childhood years is primarily responsible for this trend.

Which of the following, if true, most seriously weakens the explanation above?

(A) Seventy-five percent of the people in the United States who are 85 or older are the children of people who themselves lived less than 65 years.
(B) The people in the United States who are now 85 represent an age group that was smaller in numbers at birth than the immediately preceeding and succeeding age groups.
(C) Thirty-five percent of the people in the United States who are 85 or older require some form of twenty-four-hour nursing care.
(D) Many of the people in the United States who are 85 or older immigrated to the United States when they were 20 years old or older.
(E) Because of decreased federal funding for medical care for pregnant mothers and for children, the life expectancy of United States citizens is likely to decrease.

SECTION 6
Time—30 minutes
38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Given the existence of so many factions in the field, it was unrealistic of Anna Freud to expect any ------- of opinion.

   (A) freedom (B) reassessment (C) uniformity (D) expression (E) formation

2. Although specific concerns may determine the intent of a research project, its results are often -------.

   (A) unanticipated (B) beneficial (C) expensive (D) spectacular (E) specialized

3. To list Reilly's achievements in a fragmentary way is -------, for it distracts our attention from the ------- themes of her work.

   (A) unproductive. .disparate
   (B) misleading. .integrating
   (C) pragmatic. .comprehensive
   (D) logical. .important
   (E) inevitable. .unsettling

4. People frequently denigrate books about recent catastrophes as morally ------- attempts to profit from misfortune, but in my view our desire for such books, together with the venerable tradition to which they belong, ------- them.

   (A) inopportune. .encourages
   (B) fortuitous. .fosters
   (C) treacherous. .safeguards
   (D) despicable. .legitimizes
   (E) corrupt. .generates

5. That many of the important laws of science were discovered during experiments designed to ------- other phenomena suggests that experimental results are the ------- of inevitable natural forces rather than of planning.

   (A) analyze. .foundations
   (B) disprove. .predecessors
   (C) alter. .adjuncts
   (D) illuminate. .consequence
   (E) verify. .essence

6. Although in eighteenth-century England an active cultural life accompanied the beginnings of middle-class consumerism, the ------- of literacy was ------- with the rise of such consumerism in the different areas of the country.

   (A) repudiation. .reconciled
   (B) renewal. .inconsistent
   (C) promotion. .combined
   (D) spread. .compatible
   (E) degree. .uncorrelated

7. The trainees were given copies of a finished manual to see whether they could themselves begin to ------- the inflexible, though tacit, rules for composing more of such instructional materials.

   (A) design (B) revise (C) disrupt (D) standardize (E) derive

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. BUTTER : MARGARINE ::
   (A) sugar : saccharin
   (B) porcelain : tile
   (C) photograph : painting
   (D) music : tape
   (E) signal : whistle

9. MUTED : COLOR ::
   (A) archaic : diction
   (B) pastoral : composition
   (C) muffled : sound
   (D) haunting : tune
   (E) unconcerned : interest

10. MUFFLER : NECK ::
   (A) sandal : foot
   (B) collar : blouse
   (C) earring : ear
   (D) mitten : hand
   (E) suspenders : trousers

11. PLANT : SOIL ::
   (A) germ : bacteria
   (B) organism : medium
   (C) sample : growth
   (D) nutrient : liquid
   (E) tree : root

12. POTTERY : SHARD ::
   (A) symphony : musician
   (B) bread : crumb
   (C) wall : brick
   (D) shoe : heel
   (E) building : architect

13. PURIFICATION : DROSS ::
   (A) distillation : vinegar
   (B) assay : gold
   (C) desalinization : salt
   (D) condensation : vapor
   (E) reaction : catalyst

14. DISGUISE : RECOGNITION ::
   (A) prevarication : statement
   (B) infidelity : marriage
   (C) camouflage : infiltration
   (D) espionage : diplomacy
   (E) padding : damage

15. GUST : WIND ::
   (A) rapids : river
   (B) blizzard : snowstorm
   (C) cloudburst : rainfall
   (D) mist : fog
   (E) surf : sea

16. DISABUSE : ERROR ::
   (A) rehabilitate : addiction
   (B) persevere : dereliction
   (C) belittle : imperfection
   (D) discredit : reputation
   (E) discern : discrimination

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Diamonds, an occasional component of rare igneous rocks called lamproites and kimberlites, have never been dated satisfactorily. However, some diamonds contain minute inclusions of silicate minerals, commonly olivine, pyroxene, and garnet. These minerals can be dated by radioactive decay techniques because of the very small quantities of radioactive trace elements they, in turn, contain. Usually, it is possible to conclude that the inclusions are older than their diamond hosts, but with little indication of the time interval involved. Sometimes, however, the crystal form of the silicate inclusions is observed to resemble more closely the internal structure of diamond than that of other silicate minerals. It is not known how rare this resemblance is, or whether it is most often seen in inclusions of silicates such as garnet, whose crystallography is generally somewhat similar to that of diamond; but when present, the resemblance is regarded as compelling evidence that the diamonds and inclusions are truly cogenetic.

17. The author implies that silicate inclusions were most often formed

(A) with small diamonds inside of them
(B) with trace elements derived from their host minerals
(C) by the radioactive decay of rare igneous rocks
(D) at an earlier period than were their host minerals
(E) from the crystallization of rare igneous material

18. According to the passage, the age of silicate minerals included in diamonds can be determined due to a feature of the

(A) trace elements in the diamond hosts
(B) trace elements in the rock surrounding the diamonds
(C) trace elements in the silicate minerals
(D) silicate minerals' crystal structure
(E) host diamonds' crystal structure

19. The author states that which of the following generally has a crystal structure similar to that of diamond?

(A) Lamproite (B) Kimberlite (C) Olivine (D) Pyroxene (E) Garnet

20. The main purpose of the passage is to

(A) explain why it has not been possible to determine the age of diamonds
(B) explain how it might be possible to date some diamonds
(C) compare two alternative approaches to determining the age of diamonds
(D) compare a method of dating diamonds with a method used to date certain silicate minerals
(E) compare the age of diamonds with that of certain silicate minerals contained within them

GO ON TO THE NEXT PAGE.

Discussion of the assimilation of Puerto Ricans in the United States has focused on two factors: social standing and the loss of national culture. In general, excessive stress is placed on one factor or the other, depending on whether the commentator is North American or Puerto Rican. Many North American social scientists, such as Oscar Handlin, Joseph Fitzpatrick, and Oscar Lewis, consider Puerto Ricans as the most recent in a long line of ethnic entrants to occupy the lowest rung on the social ladder. Such a "sociodemographic" approach tends to regard assimilation as a benign process, taking for granted increased economic advantage and inevitable cultural integration, in a supposedly egalitarian context. However, this approach fails to take into account the colonial nature of the Puerto Rican case, with this group, unlike their European predecessors, coming from a nation politically subordinated to the United States. Even the "radical" critiques of this mainstream research model, such as the critique developed in *Divided Society*, attach the issue of ethnic assimilation too mechanically to factors of economic and social mobility and are thus unable to illuminate the cultural subordination of Puerto Ricans as a colonial minority.

In contrast, the "colonialist" approach of island-based writers such as Eduardo Seda-Bonilla, Manuel Maldonado-Denis, and Luis Nieves-Falcón tends to view assimilation as the forced loss of national culture in an unequal contest with imposed foreign values. There is, of course, a strong tradition of cultural accommodation among other Puerto Rican thinkers. The writings of Eugenio Fernández Méndez clearly exemplify this tradition, and many supporters of Puerto Rico's commonwealth status share the same universalizing orientation. But the Puerto Rican intellectuals who have written most about the assimilation process in the United States all advance cultural nationalist views, advocating the preservation of minority cultural distinctions and rejecting what they see as the subjugation of colonial nationalities.

This cultural and political emphasis is appropriate, but the colonialist-thinkers misdirect it, overlooking the class relations at work in both Puerto Rican and North American history. They pose the clash of national cultures as an absolute polarity, with each culture understood as static and undifferentiated. Yet both the Puerto Rican and North American traditions have been subject to constant challenge from cultural forces within their own societies, forces that may move toward each other in ways that cannot be written off as mere "assimilation." Consider, for example, the indigenous and Afro-Caribbean traditions in Puerto Rican culture and how they influence and are influenced by other Caribbean cultures and Black cultures in the United States. The elements of coercion and inequality, so central to cultural contact according to the colonialist framework, play no role in this kind of convergence of racially and ethnically different elements of the same social class.

21. The author's main purpose is to

(A) criticize the emphasis on social standing in discussions of the assimilation of Puerto Ricans in the United States
(B) support the thesis that assimilation has not been a benign process for Puerto Ricans
(C) defend a view of the assimilation of Puerto Ricans that emphasizes the preservation of national culture
(D) indicate deficiencies in two schools of thought on the assimilation of Puerto Ricans in the United States
(E) reject the attempt to formulate a general framework for discussion of the assimilation of Puerto Ricans in the United States

22. According to the passage, cultural accommodation is promoted by

(A) Eduardo Seda-Bonilla
(B) Manuel Maldonado-Denis
(C) the author of *Divided Society*
(D) the majority of social scientists writing on immigration
(E) many supporters of Puerto Rico's commonwealth status

23. It can be inferred from the passage that a writer such as Eugenio Fernández Méndez would most likely agree with which of the following statements concerning members of minority ethnic groups?

(A) It is necessary for the members of such groups to adapt to the culture of the majority.
(B) The members of such groups generally encounter a culture that is static and undifferentiated.
(C) Social mobility is the most important feature of the experience of members of such groups.
(D) Social scientists should emphasize the cultural and political aspects of the experience of members of such groups.
(E) The assimilation of members of such groups requires the forced abandonment of their authentic national roots.

GO ON TO THE NEXT PAGE.

24. The author implies that the Puerto Rican writers who have written most about assimilation do NOT do which of the following?

(A) Regard assimilation as benign.
(B) Resist cultural integration.
(C) Describe in detail the process of assimilation.
(D) Take into account the colonial nature of the Puerto Rican case.
(E) Criticize supporters of Puerto Rico's commonwealth status.

25. It can be inferred from the passage that the "colonialist" approach is so called because its practitioners

(A) support Puerto Rico's commonwealth status
(B) have a strong tradition of cultural accommodation
(C) emphasize the class relations at work in both Puerto Rican and North American history
(D) pose the clash of national cultures as an absolute polarity in which each culture is understood as static and undifferentiated
(E) regard the political relation of Puerto Rico to the United States as a significant factor in the experience of Puerto Ricans

26. The author regards the emphasis by island-based writers on the cultural and political dimensions of assimilation as

(A) ironic
(B) dangerous
(C) fitting but misdirected
(D) illuminating but easily misunderstood
(E) peculiar but benign

27. The example discussed in lines 51-54 is intended by the author to illustrate a

(A) strength of the sociodemographic approach
(B) strength of the "colonialist" approach
(C) weakness of the sociodemographic approach
(D) weakness of the "colonialist" approach
(E) weakness of the cultural-accommodationist approach

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. OVERREACH:
(A) disparage another's work
(B) aim below one's potential
(C) seek to buy at a lower price
(D) say less than one intends
(E) tend to overstate

29. BULGE: (A) depressed region (B) tilted plane
(C) steep slope (D) rippled surface
(E) short line

30. FACILITATE: (A) evict (B) thwart
(C) define (D) make excuses for
(E) call attention to

31. EULOGY: (A) defamation (B) fluctuation
(C) characterization (D) hallucination
(E) deprivation

32. FRACAS:
(A) functional compromise
(B) reasonable judgment
(C) peaceable discussion
(D) plausible exception
(E) theoretical approach

33. HARROW: (A) assuage (B) levy (C) suffice
(D) repel (E) invert

34. BOOR: (A) forthright individual
(B) brave fighter (C) deceitful ally
(D) civil person (E) steadfast friend

35. HACKNEYED: (A) fresh (B) illicit
(C) careful (D) unpopular (E) dissenting

36. SODDEN: (A) barren (B) desiccated
(C) temperate (D) expedient (E) artificial

37. GAINSAY: (A) hesitate (B) intercede
(C) perceive (D) concur (E) praise

38. NICE: (A) indirect (B) indecisive
(C) imperceptible (D) imprecise
(E) imperturbable

FOR GENERAL TEST 20 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 3			Section 6		
Number	Answer	P+	Number	Answer	P+
1	B	89	1	C	85
2	B	88	2	A	84
3	D	51	3	B	80
4	A	48	4	D	59
5	C	49	5	D	55
6	E	44	6	E	48
7	D	30	7	E	34
8	C	76	8	A	92
9	D	83	9	C	86
10	B	77	10	D	77
11	E	67	11	B	58
12	E	61	12	B	57
13	D	54	13	C	43
14	C	34	14	E	35
15	C	35	15	C	33
16	A	14	16	A	33
17	B	88	17	D	63
18	B	74	18	C	70
19	A	79	19	E	90
20	D	54	20	B	48
21	A	81	21	D	59
22	B	26	22	E	64
23	E	52	23	A	30
24	C	42	24	A	38
25	D	76	25	E	26
26	A	50	26	C	63
27	B	44	27	D	44
28	E	92	28	B	86
29	A	90	29	A	91
30	A	86	30	B	75
31	D	83	31	A	85
32	C	75	32	C	74
33	A	43	33	A	42
34	C	39	34	D	45
35	B	34	35	A	38
36	E	29	36	B	30
37	E	26	37	D	25
38	D	7	38	D	20

QUANTITATIVE ABILITY					
Section 2			Section 4		
Number	Answer	P+	Number	Answer	P+
1	C	87	1	B	85
2	B	85	2	A	86
3	A	87	3	B	81
4	A	88	4	D	74
5	D	77	5	A	83
6	B	74	6	D	78
7	C	70	7	B	76
8	A	61	8	A	61
9	D	57	9	B	50
10	A	56	10	C	61
11	C	40	11	D	41
12	A	43	12	C	35
13	D	31	13	C	32
14	B	45	14	C	23
15	D	29	15	A	47
16	C	81	16	B	83
17	B	69	17	B	77
18	E	79	18	C	74
19	A	53	19	C	65
20	E	42	20	B	68
21	B	84	21	B	79
22	C	66	22	E	76
23	C	69	23	D	56
24	E	47	24	A	51
25	C	36	25	E	37
26	D	65	26	A	49
27	B	64	27	E	51
28	D	65	28	D	56
29	D	25	29	A	29
30	A	30	30	D	25

ANALYTICAL ABILITY					
Section 1			Section 5		
Number	Answer	P+	Number	Answer	P+
1	A	81	1	B	79
2	D	62	2	B	77
3	C	53	3	D	75
4	B	94	4	D	59
5	D	82	5	B	66
6	E	63	6	C	79
7	D	80	7	A	89
8	E	40	8	D	77
9	D	74	9	C	62
10	E	57	10	A	43
11	D	40	11	A	70
12	A	69	12	E	44
13	A	54	13	A	70
14	C	29	14	C	71
15	A	56	15	E	55
16	E	16	16	D	57
17	B	48	17	D	36
18	C	35	18	E	36
19	E	48	19	C	58
20	C	44	20	B	65
21	C	48	21	D	27
22	C	36	22	A	24
23	D	48	23	C	42
24	B	53	24	D	48
25	A	28	25	D	51

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 20 ONLY AND THE PERCENTS BELOW*

Raw Score	Verbal Scaled Score	Verbal % Below	Quantitative Scaled Score	Quantitative % Below	Analytical Scaled Score	Analytical % Below
73-76	800	99				
72	790	99				
71	780	99				
70	760	99				
69	750	98				
68	730	97				
67	720	96				
66	710	95				
65	700	95				
64	690	94				
63	680	93				
62	670	92				
61	660	90				
60	650	89	800	97		
59	630	85	800	97		
58	620	84	800	97		
57	610	82	790	96		
56	600	80	780	94		
55	590	78	760	92		
54	580	76	750	89		
53	570	74	740	88		
52	560	72	730	86		
51	550	69	730	86		
50	540	67	720	84	800	99
49	530	64	700	80	800	99
48	520	61	690	78	800	99
47	510	59	680	77	800	99
46	500	56	670	74	800	99
45	490	54	660	72	790	98
44	480	51	650	70	770	97
43	470	48	640	68	760	96
42	460	44	620	63	750	96
41	450	41	610	61	730	94
40	450	41	600	59	720	92
39	440	38	590	57	700	90
38	430	36	580	54	690	88
37	420	33	570	51	680	87
36	410	30	560	49	660	83
35	400	26	550	48	650	81
34	400	26	540	45	630	76
33	390	24	530	42	620	74
32	380	22	520	40	600	69
31	370	20	500	35	590	67
30	360	16	490	32	570	61
29	350	14	480	30	550	55
28	350	14	470	28	540	52
27	340	12	460	26	520	46
26	330	10	450	24	500	40
25	320	9	430	20	490	38
24	310	7	420	18	470	32
23	300	6	410	16	460	31
22	300	6	400	14	440	24
21	290	5	380	12	420	20
20	280	4	370	10	400	17
19	270	3	350	7	390	15
18	260	2	340	6	370	12
17	250	1	330	5	360	10
16	240	1	310	4	340	7
15	230	1	290	2	320	6
14	220	1	280	2	310	4
13	210	1	260	1	290	3
12	200	1	250	1	280	2
11	200	1	230	1	270	2
10	200	1	220	1	250	1
9	200	1	200	1	240	1
8	200	1	200	1	230	1
7	200	1	200	1	210	1
0-6	200	1	200	1	200	1

*Percent scoring below the scaled score is based on the performance of 923,359 examinees who took the General Test between October 1, 1986, and September 30, 1989. This percent below information is used for score reports during the 1990-91 testing year.

TEST 21

SECTION 1

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

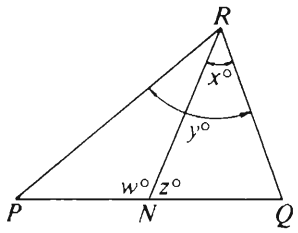
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	$xy < 0$	
1.	x	y

	Column A	Column B
2.	$(0.3)^{20}$	$(0.03)^{50}$

	Column A	Column B
	$x > 3$	
3.	$\frac{1}{x+3}$	$\frac{1}{x-2}$

The circumference of circle P is greater than the circumference of circle Q.

	Column A	Column B
4.	The radius of circle P	The diameter of circle Q

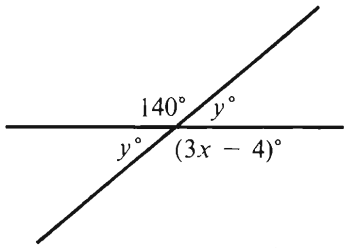
In Town X the population increased from 20,000 in 1960 to 30,000 in 1980. In Town X, the population under age ten in 1960 was 2,500, and in 1980 the population under age ten was 10 percent of the population.

	Column A	Column B
5.	The increase in the population under age ten in Town X from 1960 to 1980	600

	Column A	Column B
	$s + t = 6$	
6.	$s + 2t$	$2s + t$

John is exactly 3 years younger than Sue, and Sue is exactly 4 years older than Kim.

	Column A	Column B
7.	John's age now	Kim's age one year from now

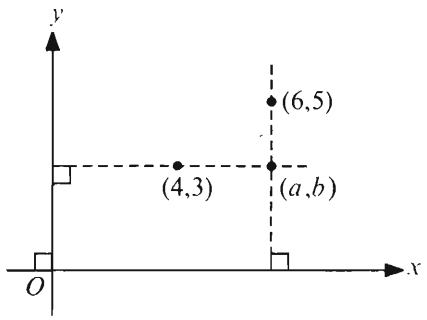
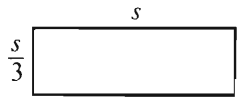


	Column A	Column B
8.	x	y

	Column A	Column B
	$24x = 18y$	
9.	$4x$	$3y$

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
10.	 a	b
11.	$\sqrt{3}$	$\frac{3}{2}$
	 The perimeter of the rectangle is 16.	
12.	The area of the rectangular region	12

	Column A	Column B
	The average (arithmetic mean) of 10 numbers is 52. When one of the numbers is discarded, the average of the remaining numbers becomes 53.	
13.	The discarded number	51
	Circles R, S, and T are in the same plane, have a common center, and have radii r, s, and $r + s$, respectively, where $0 < r < s$.	
14.	The area of the region whose boundary consists of circles R and T	πs^2
	n is an even integer.	
15.	The number of different prime factors of n	The number of different prime factors of $2n$

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Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. A dresser drawer contains 15 garments. If 40 percent of those garments are blouses, how many are not blouses?

(A) 6
(B) 8
(C) 9
(D) 10
(E) 12

17. $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \frac{1}{5} =$

(A) $\frac{32}{25}$ (B) $\frac{117}{60}$ (C) $\frac{52}{25}$ (D) $\frac{109}{50}$ (E) $\frac{137}{60}$

18. The length of a rectangular floor is 16 feet and its width is 12 feet. If each dimension were reduced by s feet to make the ratio of length to width 3 to 2, what would be the value of s?

(A) 0
(B) 2
(C) 4
(D) 6
(E) 8

19. If $y = 2^{(x-1)^2}$ and $x = 3$, then $y =$

(A) 8
(B) 16
(C) 32
(D) 64
(E) 128

20. How many even integers are between $\frac{17}{4}$ and $\frac{47}{2}$?

(A) Nine
(B) Eight
(C) Six
(D) Five
(E) Four

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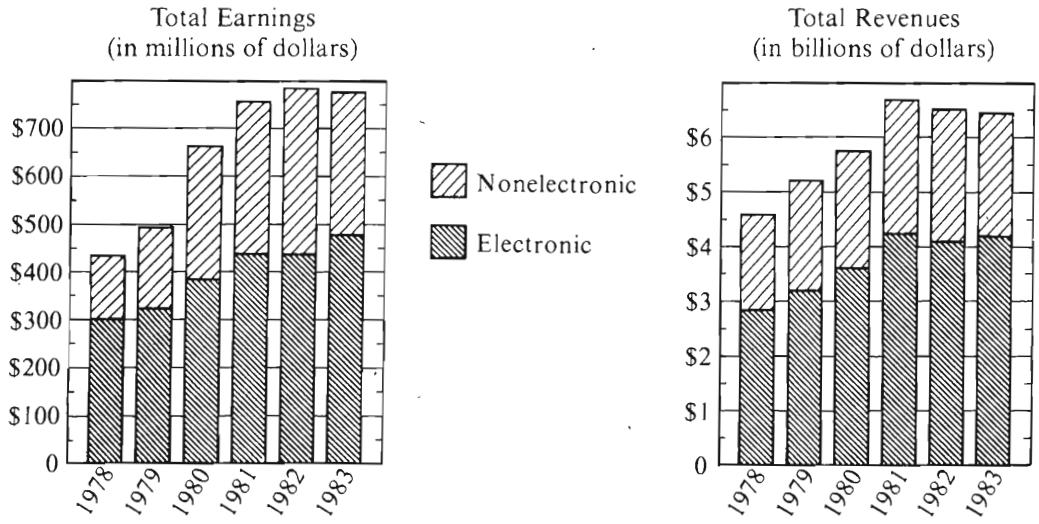
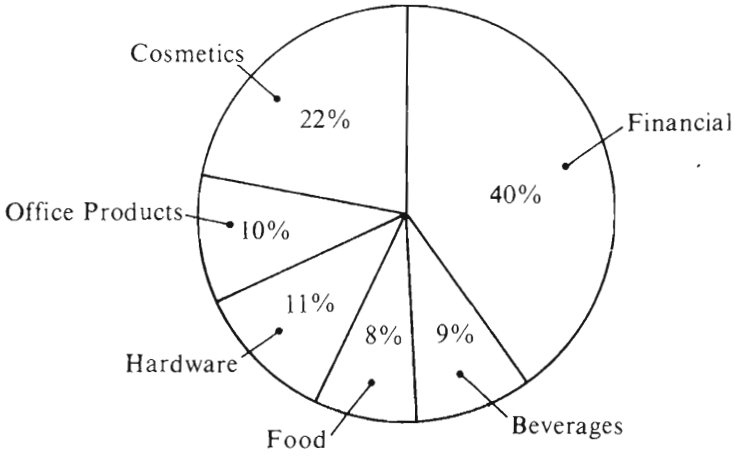
Questions 21-25 refer to the following graphs.

DISTRIBUTION OF EARNINGS AND REVENUES FOR COMPANY *X*, 1978-1983
ELECTRONIC AND NONELECTRONIC OPERATIONS

(1 billion = 1,000,000,000)



Distribution of Earnings from Nonelectronic Operations, 1983
(in millions of dollars)



Note: Drawn to scale.

GO ON TO THE NEXT PAGE.

21. Total earnings from operations in 1982 were approximately how much more than total earnings from operations in 1978 ?

(A) \$100 million
(B) \$125 million
(C) \$180 million
(D) \$340 million
(E) \$475 million

22. For the year in which earnings from electronic operations first exceeded \$400 million, total revenues were approximately

(A) \$2.8 billion
(B) \$4.5 billion
(C) \$5.2 billion
(D) \$5.8 billion
(E) \$6.7 billion

23. In 1979, total earnings for Company X were approximately what percent of total revenues?

(A) 1%
(B) 5%
(C) 10%
(D) 15%
(E) 60%

24. For the two years in which earnings from electronic operations were most nearly equal, the combined earnings from nonelectronic operations were most nearly

(A) \$340 million
(B) \$520 million
(C) \$670 million
(D) \$780 million
(E) \$1,520 million

25. In 1983 earnings from financial nonelectronic operations accounted for approximately how many millions of dollars?

(A) 312
(B) 300
(C) 180
(D) 140
(E) 120

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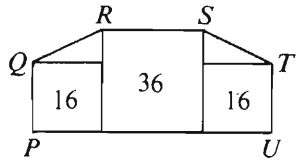
26. If k is an integer and $5^k < 20{,}000$, what is the greatest possible value of k?

(A) 6 (B) 7 (C) 8 (D) 9 (E) 10



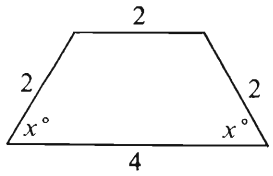
27. In the figure above, region $PQRSTU$ consists of three square regions and two triangular regions. If the square regions have areas 16, 36, and 16, what is the perimeter of $PQRSTU$?

(A) $22 + 4\sqrt{5}$
(B) $28 + 2\sqrt{5}$
(C) $28 + 4\sqrt{5}$
(D) $34 + 2\sqrt{5}$
(E) $34 + 4\sqrt{5}$

28. If x is a nonzero integer, which of the following must be a negative integer?

I. $-(3x^2 + 4)$
II. $-(-x)$
III. $(-x)^3$

(A) None
(B) I only
(C) III only
(D) I and III only
(E) I, II, and III



29. What is the area of the quadrilateral shown above?

(A) $2\sqrt{3}$
(B) $3\sqrt{3}$
(C) $6\sqrt{3}$
(D) 6
(E) 8

30. If the length of each of the sides of three square garden plots is increased by 50 percent, by what percent is the sum of the areas of the three plots increased?

(A) 375%
(B) 200%
(C) 150%
(D) 125%
(E) 50%

SECTION 2

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-5

An old painting portrays a seated jury of exactly six persons arranged in two parallel rows of three persons each. Each person in the back row is directly behind one person in the front row. The positions of the six jurors, numbered 1 through 6 by historians, appear in the painting as follows:

Back row, left to right—4 5 6
Front row, left to right—1 2 3

Inscribed on the back of the paintings are the names of exactly five persons—Urquart, Vere, Winters, Young, and Zeno. The historians know that each of these five persons is a juror portrayed in the painting. The name of the sixth person in the painting is unknown. The only additional information that historians have comes from letters of the time, which indicate the following:

Zeno is in position 5.
Young is directly behind Winters.
Urquart is not in the same row as Vere.

1. If the jury's front row is made up, from left to right, of Urquart, the juror whose name is unknown, and Winters, which of the following must be true?

   (A) Vere is in position 4.
   (B) Vere is in position 5.
   (C) Vere is in position 6.
   (D) Young is in position 4.
   (E) Young is in position 5.

2. If one of the two rows is made up, from left to right, of Winters, the juror whose name is unknown, and Vere, then Urquart must be in position

   (A) 1
   (B) 2
   (C) 3
   (D) 4
   (E) 6

3. If Urquart is directly in front of Zeno, which of the following must be true?

   (A) Vere is in position 4.
   (B) Vere is directly behind the juror whose name is unknown.
   (C) The juror whose name is unknown is in position 1.
   (D) The juror whose name is unknown is in position 6.
   (E) The juror whose name is unknown is directly behind Vere.

4. Which of the following jurors must be in the same row as Zeno?

   (A) Urquart
   (B) The juror whose name is unknown
   (C) Vere
   (D) Winters
   (E) Young

5. Which of the following, if it could be established, would allow historians to determine the positions of all other jurors portrayed in the painting?

   (A) The juror whose name is unknown is in position 1.
   (B) Vere is in position 2.
   (C) Vere is in position 3.
   (D) Winters is in position 1.
   (E) Young is in position 6.

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6. The average after-tax income for a household was 2.4 percent higher in 1983 than in 1982. At the same time, average after-tax income declined for households at the lower- and middle-income levels.

   Which of the following can be most reasonably inferred from the information above?

   (A) There were more households overall in 1983 than in 1982.
   (B) There were fewer households at the upper-income level in 1983 than in 1982.
   (C) Total after-tax income for all households at the lower- and middle-income levels was higher in 1983 than in 1982.
   (D) Average after-tax income for households at the upper-income level rose by more than 2.4 percent between 1982 and 1983.
   (E) Average after-tax income for households at the lower- and middle-income levels was declining prior to 1982.

7. A study of attitudes toward new cars showed that cars that were identical in every respect except color received widely differing ratings for quality from potential buyers. Therefore, in future advertisements for cars of high quality, we can expect to see no variety in the color of car featured.

   Which of the following is an assumption made in the passage above?

   (A) If a car in a preferred color is not available, a buyer is usually willing to accept the car in another color.
   (B) New cars differ significantly from each other with respect to quality.
   (C) There is a single color generally associated with the highest quality rating in the study.
   (D) An advertisement for a particular car should display all of its significant advantages.
   (E) Potential buyers give more weight to color than to price in making a decision about a car.

8. Sometime during the 1950's, rock music permanently ousted jazz from the music scene. This is evident from the behavior of youths of that time. In crowded nightclubs they would applaud rock acts enthusiastically. But when a jazz act began, they went outside and got refreshments. They came back in only when the jazz set was finished.

   Which of the following statements, if true, is a valid objection to the conclusion drawn above?

   (A) Jazz is the most important musical contribution of the United States to world culture.
   (B) Although some young people who attended nightclubs in the 1950's did try to listen to jazz, they eventually became bored with it.
   (C) Since the 1960's, rock music has not only provided youths with recreation but has, as well, become a rallying point for making social statements.
   (D) Although by 1960 jazz performances were less popular, there has since been a revival of interest in jazz among middle-class professionals.
   (E) Jazz steadily increased in popularity between the 1930's and the 1950's.

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Questions 9-14

In a city, the public transportation system consists of one subway line and one bus line.

The subway goes from station T to R to S to G to H to I, stopping at each station, and then returns, making the same stops in the reverse order.

The bus goes from station R to W to L to G to F, stopping at each station, and then returns, making the same stops in the reverse order.

On each line, there are frequent buses or trains that make each stop along the route.

During rush hour, there is also an express bus on the bus line that stops only at R, L, and F and returns, making the same three stops in the reverse order.

A passenger can transfer from the subway or bus line to the other line wherever the bus and subway both stop at a station with the same name.

It is not possible to transfer from an express bus to a nonexpress bus.

There is no other means of transportation available on the public transportation system.

9. To make a trip on public transportation from S to I, a passenger must pass through which of the following additional stops?

   (A) G and H only
   (B) F, G, and H only
   (C) H, L, and W only
   (D) F, H, L, and W only
   (E) G, H, L, and R only

10. Using buses only, a passenger CANNOT go on public transportation from

    (A) F to W
    (B) G to R
    (C) L to H
    (D) L to R
    (E) W to L

11. To go on public transportation from F to T, a passenger must

    (A) transfer at G
    (B) transfer at R
    (C) take a vehicle to or through R
    (D) take a vehicle to or through S
    (E) take a vehicle to or through W

12. If a fire temporarily closes the subway tracks at R to subway trains but the subway still runs from I to S and the bus still stops at R, it will be IMPOSSIBLE for any passenger to go on public transportation to

    (A) F
    (B) I
    (C) L
    (D) R
    (E) T

13. To make a trip on public transportation from I to W during rush hour, a passenger must do which of the following?

    (A) Transfer to a bus at G.
    (B) Ride the subway only.
    (C) Board a nonexpress bus.
    (D) Ride a bus past L.
    (E) Go through S on the subway.

14. If all nonexpress buses are halted during rush hour by equipment failures, is it possible during rush hour for a passenger to board an express bus at L and then go to G?

    (A) It is not possible.
    (B) It is possible, but only if the passenger transfers at R.
    (C) It is possible, but only if the passenger transfers at F.
    (D) It is possible, but only if the passenger goes through both F and R.
    (E) It is possible, but only if the passenger takes a bus that stops at W.

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Questions 15-18

Internal audits in the Goodcrop Corporation are overseen by a panel of exactly five staff members. Panelists are drawn from the company's divisions: Fertilizers, Pesticides, and Seeds. There is a standard way of referring to the composition of any panel: the member with the longest current term of service on the panel is listed first, then the others in decreasing order of current term of service, and the letters F, P, or S are added as subscripts to each name to indicate whether a panelist works in Fertilizers, Pesticides, or Seeds, respectively. At the beginning of each month, exactly one panelist is rotated off the panel and a new panelist is appointed as a replacement. The monthly rotation is subject to the following conditions:

If the panelist being rotated off is from Fertilizers, his or her replacement must either also be from Fertilizers or be from Seeds.
If the panelist being rotated off is from Pesticides, his or her replacement must be from Fertilizers.
If the panelist being rotated off is from Seeds, his or her replacement must be from Pesticides.
The panelist being rotated off must be the one with the longest current term of service on the panel.

15. If the list of panel members for May begins with "Ms. Liang_P," which of the following must be true of the list of panel members for June?

(A) It begins with the name of a staff member from Fertilizers.
(B) It begins with the name of a staff member from Pesticides.
(C) It begins with the name of a staff member from Seeds.
(D) It ends with the name of a staff member from Fertilizers.
(E) It ends with the name of a staff member from Seeds.

16. If the April panel is listed as "Ms. Medeiros_P, Mr. Liu_F, Ms. Ortiz_S, Mr. Giro_S, and Mr. Rossi_F," which of the following will happen at the beginning of July?

(A) Mr. Liu will be rotated off and replaced by someone from Seeds.
(B) Mr. Liu will be rotated off and replaced by someone else from Fertilizers.
(C) Ms. Ortiz will be rotated off and replaced by someone from Pesticides.
(D) Ms. Ortiz will be rotated off and replaced by someone else from Seeds.
(E) Mr. Giro will be rotated off and replaced by someone from Pesticides.

17. If all the members of the March panel are from Pesticides, which of the following is the earliest month in which the panel members could all be from Fertilizers?

(A) July
(B) August
(C) September
(D) October
(E) November

18. If the members of the July panel are listed, from first to last, as being from divisions F, P, S, F, and S, respectively, the members of the October panel could be, respectively, from divisions

(A) F, F, P, S, and P
(B) F, P, S, P, and F
(C) F, S, F, F, and P
(D) P, S, S, F, and P
(E) S, F, S, P, and S

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Questions 19-22

The officers of Renco Manufacturing are analyzing their company's chances of winning a large contract to manufacture equipment for the state highway department. Renco is one of five companies competing for the contract: the others are Selway, Inc., Tate Industries, Upshaw Corp., and Velco. The contract will be awarded on the basis of points given in three categories: cost, amount of experience on similar contracts, and quality of equipment. In each category, the company that is best in that category will receive five points, the second best, 4 points, and so on down to 1. There will be no ties within any of the categories. The company that receives the highest total number of points will be awarded the contract. In the event of a tie, the company with the higher number of 5's will be awarded the contract; if the number of 5's is the same, additional criteria will be used to break the tie.

19. The highest total number of points that any of the competing companies can receive is

(A) twelve
(B) fourteen
(C) fifteen
(D) twenty
(E) twenty-five

20. If no one company is given the same number of points in any two categories, the highest possible winning total is

(A) eleven
(B) twelve
(C) thirteen
(D) fourteen
(E) fifteen

21. If the five companies tie with nine points each, which of the following CANNOT be the distribution of points received by any of the companies?

(A) Three 3's
(B) Two 4's and a 1
(C) A 5 and two 2's
(D) A 4, a 3, and a 2
(E) A 5, a 3, and a 1

22. If Selway, Inc. and Velco between them receive all of the 1's and 2's and each of the remaining three competitors receives a 5, Renco would need to receive how many points in addition to its 5 to be awarded the contract without having first been tied for total number of points?

(A) Four
(B) Five
(C) Six
(D) Seven
(E) Eight

---

23. Persons imprisoned for violent street crimes often commit the same crimes again after being released. Persons imprisoned for white-collar crimes such as receiving bribes or embezzlement, however, typically do not, after being released, repeat the crimes for which they have been imprisoned. It is fair to conclude that imprisonment, while it often fails to change the behavior of violent street criminals, does succeed in making white-collar criminals unwilling to repeat their crimes.

Which of the following, if true, would most seriously weaken the conclusion stated above?

(A) Statistics show that persons convicted of committing white-collar crimes rarely have a prison record.
(B) The percentage of those who commit white-collar crimes and are imprisoned for doing so is lower than the percentage of those who commit violent street crimes and are imprisoned for doing so.
(C) White-collar criminals whose prison sentences are shortened return to criminal activities at a slightly higher rate than white-collar criminals who serve their full sentences.
(D) Persons released from prison after white-collar crimes are seldom given high positions or access to other people's money.
(E) Persons who commit violent street crimes seldom commit white-collar crimes, and vice versa.

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24. Industrial solvents, which can damage the liver, kidneys, and nervous system, often drain into public water supplies. Currently, tested water is considered pure if the amount of solvent an individual is exposed to through drinking one-half gallon of water per day—roughly what a typical adult drinks per day—does not pose a significant threat to human health. But many toxicologists claim that the standard set by this method does not adequately protect the public.

Which of the following, if true, would best support the claim of the toxicologists mentioned above?

(A) The figure of one-half gallon a day includes water contained in beverages such as soft drinks, which are often bottled at locations distant from where they are consumed.
(B) Some industrial solvents have less toxic but more expensive analogues that industry has not adopted for use.
(C) Water treatment centers usually filter out bacteria and other organisms before the water is pumped into public supply systems.
(D) Industrial polluters are rarely fined or punished, even when they knowingly allow toxic chemicals to enter water supplies.
(E) More solvent enters the body through skin absorption, during washing and bathing, than through drinking.

25. Many behavioral studies of the psychological capacities of animals reveal hardly any difference between rats and chimpanzees. The most reasonable explanation for such results is that the studies themselves are inadequate.

The argument above relies on the unstated premise that

(A) rats and chimpanzees do not have highly developed psychological capacities
(B) the results of psychological studies of animals are often misinterpreted by biased experimenters
(C) there is no way to measure objectively the psychological capacities of animals
(D) there is considerable difference between the psychological capacities of rats and those of chimpanzees
(E) examining the brain of an animal is a better means of determining its psychological capacity than is a study of the animal's behavior

SECTION 3

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Many artists believe that successful imitation, far from being symptomatic of a lack of -------, is the first step in learning to be creative.

   (A) elegance (B) resolution (C) goodness
   (D) originality (E) sympathy

2. As serious as she is about the bullfight, she does not allow respect to ------- her sense of whimsy when painting it.

   (A) inspire (B) provoke (C) suppress
   (D) attack (E) satisfy

3. No one is ------- about Stephens; he inspires either uncritical adulation or profound ------- in those who work for him.

   (A) neutral. . antipathy
   (B) infuriated. . aversion
   (C) worried. . anxiety
   (D) enthusiastic. . veneration
   (E) apprehensive. . consternation

4. Before about 1960, virtually all accounts of evolution assumed most adaptation to be a product of selection at the level of populations; recent studies of evolution, however, have found no ------- this ------- view of selection.

   (A) departures from. . controversial
   (B) basis for. . pervasive
   (C) bias toward. . unchallenged
   (D) precursors of. . innovative
   (E) criticisms of. . renowned

5. The new biological psychiatry does not deny the contributing role of psychological factors in mental illnesses, but posits that these factors may act as a catalyst on existing physiological conditions and ------- such illnesses.

   (A) disguise (B) impede (C) constrain
   (D) precipitate (E) consummate

6. During periods of social and cultural stability, many art academies are so firmly controlled by ------- that all real creative work must be done by the -------.

   (A) dogmatists. . disenfranchised
   (B) managers. . reactionaries
   (C) reformers. . dissatisfied
   (D) imposters. . academicians
   (E) specialists. . elite

7. The First World War began in a context of jargon and verbal delicacy and continued in a cloud of ------- as ------- as language and literature, skillfully used, could make it.

   (A) circumlocution. . literal
   (B) cliché. . lucid
   (C) euphemism. . impenetrable
   (D) particularity. . deliberate
   (E) subjectivity. . enthralling

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. THERMOMETER : TEMPERATURE ::
   (A) plane : thickness
   (B) wrench : torque
   (C) camera : exposure
   (D) compass : direction
   (E) grindstone : sharpness

9. FOOLPROOF : FAIL :: (A) translucent : filter
   (B) viscous : smear (C) volatile : explode
   (D) airtight : leak (E) taut : break

10. SUFFOCATE : OXYGEN :: (A) restrict : supplies
    (B) rob : money (C) inhibit : drives
    (D) imprison : freedom (E) starve : nutrients

11. ORCHESTRA : MUSIC :: (A) vocalist : song
    (B) poet : anthology (C) actor : cues
    (D) choreographer : ballet (E) troupe : drama

12. BIRD : SNARE :: (A) lion : den (B) fish : seine
    (C) lamb : shears (D) scorpion : sting
    (E) lobster : claw

13. RESOLUTENESS : WILL :: (A) zeal : conviction
    (B) honor : restitution (C) esteem : adoration
    (D) anguish : hesitation (E) sorrow : compassion

14. MILLER : GRAIN :: (A) carpenter : awl
    (B) forger : furnace (C) tanner : hide
    (D) vintner : wine (E) mason : cement

15. DIDACTIC : INSTRUCT ::
    (A) pedantic : contend (B) comic : amuse
    (C) theatrical : applaud (D) imperative : obey
    (E) rhetorical : recite

16. GARRULOUS : TALKATIVE ::
    (A) suspicious : unreliable
    (B) cantankerous : obtuse
    (C) cloying : sweet
    (D) reflective : insightful
    (E) prudent : indecisive

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Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Geologists have long known that the Earth's mantle is heterogeneous, but its spatial arrangement remains unresolved—is the mantle essentially layered or irregu-
Line (5) larly heterogeneous? The best evidence for the layered-mantle thesis is the well-established fact that volcanic rocks found on oceanic islands, islands believed to result from mantle plumes arising from the lower mantle, are composed of material fundamentally different from that of the midocean ridge system, whose source, most geolo-
(10) gists contend, is the upper mantle.

Some geologists, however, on the basis of observations concerning mantle xenoliths, argue that the mantle is not layered, but that heterogeneity is created by fluids rich in "incompatible elements" (elements
(15) tending toward liquid rather than solid state) percolating upward and transforming portions of the upper mantle irregularly, according to the vagaries of the fluids' pathways. We believe, perhaps unimaginatively, that this debate can be resolved through further study, and that the underexplored midocean ridge system is the key.

17. Which of the following best expresses the main idea of the passage?

(A) Current theories regarding the structure of the Earth's mantle cannot account for new discoveries regarding the composition of mantle xenoliths.
(B) There are conflicting hypotheses about the heterogeneity of the Earth's mantle because few mantle elements have been thoroughly studied.
(C) Further research is needed to resolve the debate among geologists over the composition of the midocean ridge system.
(D) There is clear-cut disagreement within the geological community over the structure of the Earth's mantle.
(E) There has recently been a strong and exciting challenge to geologists' long-standing belief in the heterogeneity of the Earth's mantle.

18. According to the passage, it is believed that oceanic islands are formed from

(A) the same material as mantle xenoliths
(B) the same material as the midocean ridge system
(C) volcanic rocks from the upper mantle
(D) incompatible elements percolating up from the lower mantle
(E) mantle plumes arising from the lower mantle

19. It can be inferred from the passage that the supporters of the "layered-mantle" theory believe which of the following?

I. The volcanic rocks on oceanic islands are composed of material derived from the lower part of the mantle.
II. The materials of which volcanic rocks on oceanic islands and midocean ridges are composed are typical of the layers from which they are thought to originate.
III. The differences in composition between volcanic rocks on oceanic islands and the midocean ridges are a result of different concentrations of incompatible elements.

(A) I only
(B) III only
(C) I and II only
(D) II and III only
(E) I, II, and III

20. The authors suggest that their proposal for determining the nature of the mantle's heterogeneity might be considered by many to be

(A) pedestrian
(B) controversial
(C) unrealistic
(D) novel
(E) paradoxical

GO ON TO THE NEXT PAGE.

Many literary detectives have pored over a great puzzle concerning the writer Marcel Proust: what happened in 1909 ? How did *Contre Saint-Beuve*, an essay attacking the methods of the critic Saint-Beuve, turn into the start of the novel *Remembrance of Things Past*? A recently published letter from Proust to the editor Vallette confirms that Fallois, the editor of the 1954 edition of *Contre Saint-Beuve*, made an essentially correct guess about the relationship of the essay to the novel. Fallois proposed that Proust had tried to begin a novel in 1908, abandoned it for what was to be a long demonstration of Saint-Beuve's blindness to the real nature of great writing, found the essay giving rise to personal memories and fictional developments, and allowed these to take over in a steadily developing novel.

Draft passages in Proust's 1909 notebooks indicate that the transition from essay to novel began in *Contre Saint-Beuve*, when Proust introduced several examples to show the powerful influence that involuntary memory exerts over the creative imagination. In effect, in trying to demonstrate that the imagination is more profound and less submissive to the intellect than Saint-Beuve assumed, Proust elicited vital memories of his own and, finding subtle connections between them, began to amass the material for *Remembrance*. By August, Proust was writing to Vallette, informing him of his intention to develop the material as a novel. Maurice Bardèche, in *Marcel Proust, romancier*, has shown the importance in the drafts of *Remembrance* of spontaneous and apparently random associations of Proust's subconscious. As incidents and reflections occurred to Proust, he continually inserted new passages altering and expanding his narrative. But he found it difficult to control the drift of his inspiration. The very richness and complexity of the meaningful relationships that kept presenting and rearranging themselves on all levels, from abstract intelligence to profound dreamy feelings, made it difficult for Proust to set them out coherently. The beginning of control came when he saw how to connect the beginning and the end of his novel.

Intrigued by Proust's claim that he had "begun and finished" *Remembrance* at the same time, Henri Bonnet discovered that parts of *Remembrance's* last book were actually started in 1909. Already in that year, Proust had drafted descriptions of his novel's characters in their old age that would appear in the final book of *Remembrance*, where the permanence of art is set against the ravages of time. The letter to Vallette, drafts of the essay and novel, and Bonnet's researches establish in broad outline the process by which Proust generated his novel out of the ruins of his essay. But those of us who hoped, with Kolb, that Kolb's newly published complete edition of Proust's correspondence for 1909 would document the process in greater detail are disappointed. For until Proust was confident that he was at last in sight of a viable structure for *Remembrance*, he told few correspondents that he was producing anything more ambitious than *Contre Saint-Beuve*.

21. The passage is primarily concerned with
    (A) the role of involuntary memory in Proust's writing
    (B) evidence concerning the genesis of Proust's novel *Remembrance of Things Past*
    (C) conflicting scholarly opinions about the value of studying the drafts of *Remembrance of Things Past*
    (D) Proust's correspondence and what it reveals about *Remembrance of Things Past*
    (E) the influence of Saint-Beuve's criticism on Proust's novel *Remembrance of Things Past*

22. It can be inferred from the passage that all of the following are literary detectives who have tried, by means of either scholarship or criticism, to help solve the "great puzzle" mentioned in lines 1-2 EXCEPT
    (A) Bardèche
    (B) Bonnet
    (C) Fallois
    (D) Kolb
    (E) Vallette

23. According to the passage, in drafts of *Contre Saint-Beuve* Proust set out to show that Saint-Beuve made which of the following mistakes as a critic?
    I. Saint-Beuve made no effort to study the development of a novel through its drafts and revisions.
    II. Saint-Beuve assigned too great a role in the creative process to a writer's conscious intellect.
    III. Saint-Beuve concentrated too much on plots and not enough on imagery and other elements of style.
    (A) II only
    (B) III only
    (C) I and II only
    (D) I and III only
    (E) I, II, and III

GO ON TO THE NEXT PAGE.

24. Which of the following best states the author's attitude toward the information that scholars have gathered about Proust's writing in 1909 ?

(A) The author is disappointed that no new documents have come to light since Fallois's speculations.
(B) The author is dissatisfied because there are too many gaps and inconsistencies in the drafts.
(C) The author is confident that Fallois's 1954 guess has been proved largely correct, but regrets that still more detailed documentation concerning Proust's transition from the essay to the novel has not emerged.
(D) The author is satisfied that Fallois's judgment was largely correct, but feels that Proust's early work in designing and writing the novel was probably far more deliberate than Fallois's description of the process would suggest.
(E) The author is satisfied that the facts of Proust's life in 1909 have been thoroughly established, but believes such documents as drafts and correspondence are only of limited value in a critical assessment of Proust's writing.

25. The author of the passage implies that which of the following would be the LEAST useful source of information about Proust's transition from working on *Contre Saint-Beuve* to having a viable structure for *Remembrance of Things Past?*

(A) Fallois's comments in the 1954 edition of *Contre Saint-Beuve*
(B) Proust's 1909 notebooks, including the drafts of *Remembrance of Things Past*
(C) Proust's 1909 correspondence, excluding the letter to Vallette
(D) Bardèche's *Marcel Proust, romancier*
(E) Bonnet's researches concerning Proust's drafts of the final book of *Remembrance of Things Past*

26. The passage offers information to answer which of the following questions?

(A) Precisely when in 1909 did Proust decide to abandon *Contre Saint-Beuve*?
(B) Precisely when in 1909 did Proust decide to connect the beginning and the end of *Remembrance of Things Past*?
(C) What was the subject of the novel that Proust attempted in 1908 ?
(D) What specific criticisms of Saint-Beuve appear, in fictional form, in *Remembrance of Things Past*?
(E) What is a theme concerning art that appears in the final book of *Remembrance of Things Past*?

27. Which of the following best describes the relationship between *Contre Saint-Beuve* and *Remembrance of Things Past* as it is explained in the passage?

(A) Immediately after abandoning *Contre Saint-Beuve*, at Vallette's suggestion, Proust started *Remembrance* as a fictional demonstration that Saint-Beuve was wrong about the imagination.
(B) Immediately after abandoning *Contre Saint-Beuve*, at Vallette's suggestion, Proust turned his attention to *Remembrance*, starting with incidents that had occurred to him while planning the essay.
(C) Despondent that he could not find a coherent structure for *Contre Saint-Beuve*, an essay about the role of memory in fiction, Proust began instead to write *Remembrance*, a novel devoted to important early memories.
(D) While developing his argument about the imagination in *Contre Saint-Beuve*, Proust described and began to link together personal memories that became a foundation for *Remembrance*.
(E) While developing his argument about memory and imagination in *Contre Saint-Beuve*, Proust created fictional characters to embody the abstract themes in his essay.

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. FREQUENT: (A) contain (B) restore (C) sever (D) visit rarely (E) defend eagerly

29. COMPOUND: (A) reveal (B) concentrate (C) activate (D) conserve (E) separate

30. CRASS: (A) demanding (B) florid (C) refined (D) intrepid (E) fair

31. PLASTICITY: (A) tightness (B) contiguity (C) stasis (D) rigidity (E) order

32. CONVOKE: (A) forgive (B) eradicate (C) adjourn (D) omit (E) abridge

33. COMMODIOUS: (A) calm (B) careless (C) reticent (D) enclosed (E) cramped

34. CORROBORATE: (A) complicate (B) controvert (C) conflate (D) condone (E) counterfeit

35. MACULATED: (A) unobserved (B) unfocused (C) unplanned (D) unfeigned (E) unspotted

36. ESOTERIC: (A) unsophisticated (B) worthless (C) lasting (D) generally known (E) well expressed

37. FRUSTRATE: (A) expand (B) enjoy (C) nullify (D) abet (E) prepare

38. ASPERSIONS: (A) qualms (B) apologies (C) rewards (D) vexation (E) flattery

SECTION 4

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

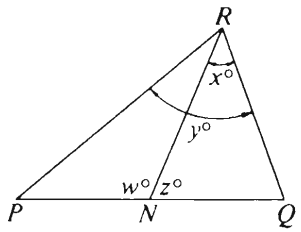
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

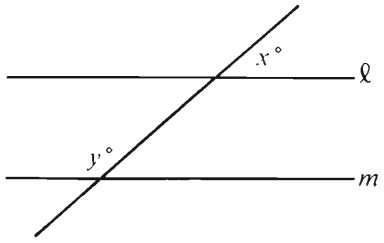


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

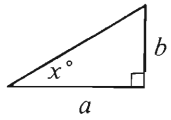
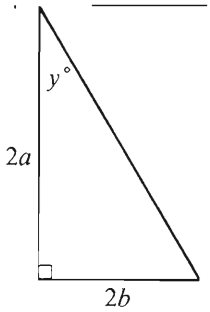
	Column A	Column B
	$k + n = 13$ $n + 3 = 8$	
1.	k	n

	Column A	Column B
	 $\ell \parallel m$	
2.	$x + y$	180

	Column A	Column B
	Last year Pat earned \$700 per month for each of the first 7 months of the year and \$800 per month for each of the last 5 months of the year.	
3.	Pat's average (arithmetic mean) monthly earnings last year	\$750

	Column A	Column B
	x copies of sports magazine X cost a total of \$12.	
4.	The total cost, in dollars, of m copies of fashion magazine M	$\frac{12m}{x}$

	Column A	Column B
	$x = 2$ and $y = 3$.	
5.	$x + 2y$	x^y

	Column A	Column B
		
6.	x	y

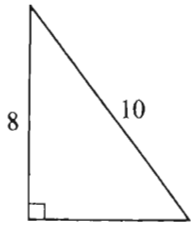
	Column A	Column B
7.	$\frac{10}{\frac{1}{2}}$	$\frac{1}{2}(10)$

	Column A	Column B
	$x > 0$	
8.	$\frac{1}{1 + \frac{1}{x}}$	1

	Column A	Column B
	$x^2 + 3 = 19$ $x < 0$	
9.	x	-4

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
10.	The area of the triangular region 	40
	$\frac{3}{7} < \frac{n}{21}$	
11.	n	7
12.	The area of a circular region with diameter $2k$	The area of a square region with side $2k$

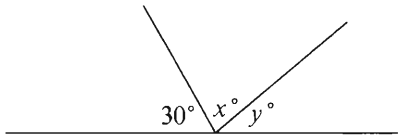
	Column A	Column B
	n is a positive integer.	
13.	$(-1)^{n-1}$	0
	$0 < m < n$	
14.	$n - m$	$\frac{n + m}{2}$
	RS is a diameter of a circle.	
15.	The ratio of the length of diameter RS to the length of semicircular arc RS	$\frac{2}{3}$

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. If $6x - 4y = 2$ and $x = 3$, then $x + y =$

(A) 4
(B) 5
(C) 7
(D) 12
(E) 19

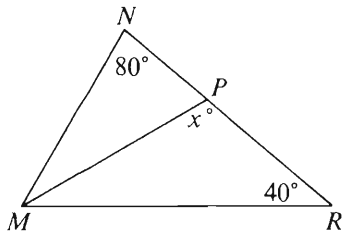


17. In the figure above, if $x = 2y$, then $y =$

(A) 50
(B) 40
(C) 30
(D) 20
(E) 10

18. Sue drives 10 miles from home to work. If she could average 50 miles per hour, how many minutes would it take her to drive from home to work?

(A) 20
(B) 18
(C) 15
(D) 12
(E) 10



19. In the figure above, if MP bisects $\angle NMR$, then $x =$

(A) 80
(B) 90
(C) 100
(D) 110
(E) 120

20. If $x + 2y = 2x - y$, then $x =$

(A) $-y$
(B) $\frac{y}{3}$
(C) y
(D) $2y$
(E) $3y$

GO ON TO THE NEXT PAGE.

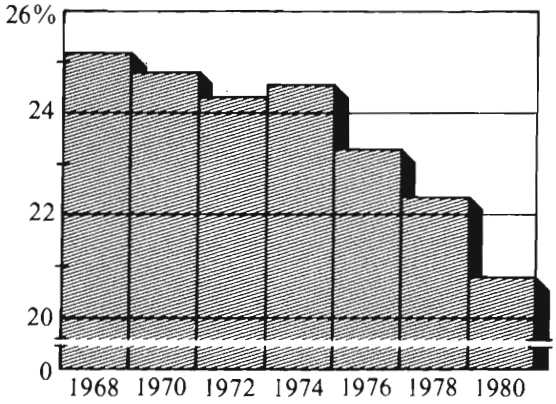
Questions 21-25 refer to the following data.

UNION MEMBERSHIP IN THE LABOR FORCE, 1968-1980

Labor Force

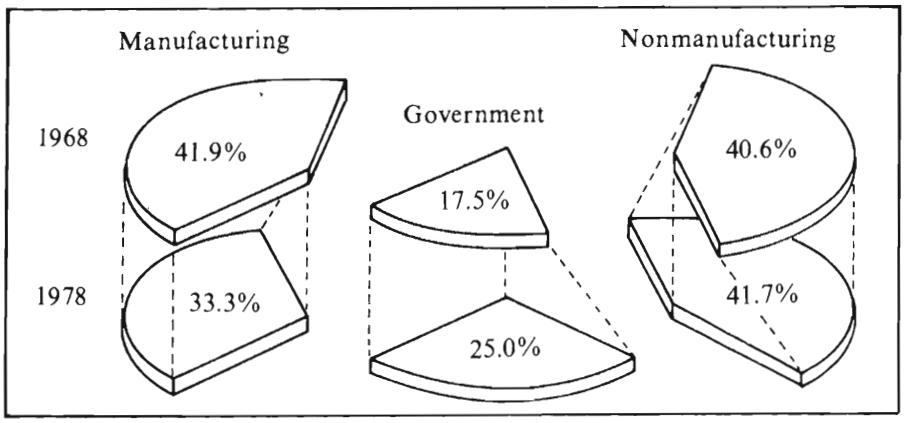
Year	Workers (in millions)
1968	75.9
1970	78.6
1972	81.7
1974	85.9
1976	87.5
1978	94.4
1980	96.5

Union Membership as a Percent of the Labor Force



Chicago Tribune.

Distribution of Union Membership by Economic Sector



Chicago Tribune.

Note: Drawn to scale.

GO ON TO THE NEXT PAGE.

21. Over which of the following two-year periods was there the greatest increase in the number of workers in the labor force?

(A) 1968-1970
(B) 1970-1972
(C) 1972-1974
(D) 1974-1976
(E) 1976-1978

22. In 1974 approximately how many million workers were members of a labor union?

(A) 17.2 (B) 19.2 (C) 21.1
(D) 24.5 (E) 85.9

23. From 1968 to 1980, the size of the labor force increased by approximately what percent?

(A) 20%
(B) 21%
(C) 27%
(D) 73%
(E) 80%

24. In 1978 there were approximately 21 million union members. Approximately how many million more of these were in the manufacturing sector than in the government sector?

(A) 8.6
(B) 7.8
(C) 6.9
(D) 5.2
(E) 1.7

25. In 1968 the number of union members in the non-manufacturing sector was approximately what percent of the total labor force?

(A) 10%
(B) 15%
(C) 25%
(D) 30%
(E) 41%

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26. In the equation $kx + y = 16$, k is a constant. If $y = 6$ when $x = 2$, what is the value of y when $x = 4$?

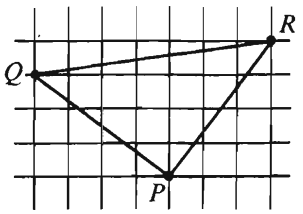
(A) -8 (B) -4 (C) $\frac{11}{4}$ (D) 5 (E) 12

27. The greatest prime factor of 162 is

(A) 2
(B) 3
(C) 29
(D) 31
(E) 81

28. If the cost of x gallons of unleaded gasoline priced at \$1.24 per gallon equals the cost of $x + 2$ gallons of regular gasoline priced at \$1.16 per gallon, then $x =$

(A) 29.0
(B) 24.0
(C) 16.5
(D) 14.5
(E) 12.0



29. In the figure above, the grid consists of unit squares and P, Q, and R are points of intersection of the grid as shown. What is the perimeter of triangular region PQR?

(A) 15
(B) 17
(C) 20
(D) $5 + 5\sqrt{2}$
(E) $10 + 5\sqrt{2}$

30. If a and b are integers and $a - b = 6$, then $a + b$ CANNOT be

(A) 0
(B) less than 6
(C) greater than 6
(D) an even integer
(E) an odd integer

SECTION 5

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-3

Four lifeguards—F, G, H, and J—work at a swimming pool that is open six days a week, Monday through Saturday. Each day exactly one lifeguard is on duty. The pool manager assigns guard duty each week according to the following conditions:

Each lifeguard is assigned duty at least one day a week.

No lifeguard is assigned duty on two consecutive days.

1. If during one week F is assigned duty on Monday and Saturday only, which of the following must be true of the assignments for that week?

   (A) One other lifeguard besides F is assigned duty on two days.
   (B) The lifeguard assigned duty on Wednesday cannot be assigned duty on Friday.
   (C) H is assigned duty on the day immediately before the day on which G is assigned duty.
   (D) Either G or H is assigned duty on Tuesday.
   (E) Either H or J is assigned duty on Friday.

2. If during one week H is assigned duty on exactly two days and G and J are each assigned duty on days earlier in the week than the first day on which H is assigned duty, H could be assigned duty on which of the following pairs of days?

   (A) Monday and Wednesday
   (B) Tuesday and Thursday
   (C) Tuesday and Saturday
   (D) Wednesday and Saturday
   (E) Friday and Saturday

3. If during one week F is assigned duty on Tuesday and two other days, which of the following CANNOT be true?

   (A) F is assigned duty on Saturday.
   (B) F and H are assigned duty on consecutive days.
   (C) G and H are assigned duty on consecutive days.
   (D) G and H are assigned duty on days before Thursday.
   (E) F is assigned duty on a day immediately before a day on which G is assigned duty and on a day immediately before a day on which J is assigned duty.

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4. Because of rules imposed by the Federal Drug Administration restricting the sale of thalidomide, many people who have trouble sleeping turn to barbiturates. Yet each year barbiturate-alcohol interactions cause the deaths of over a thousand people who probably would have lived had they used thalidomide instead of barbiturates, even without changing their alcohol consumption.

   Which of the following statements about thalidomide is best supported by the statements above?

   (A) Thalidomide alone poses no serious health risks.
   (B) Barbiturates alone are more dangerous than alcohol alone.
   (C) Thalidomide is a more effective sleeping aid than barbiturates.
   (D) In some cases, the thalidomide-barbiturate interaction would be less dangerous than the barbiturate-alcohol interaction.
   (E) In some cases, the thalidomide-alcohol interaction would be less life-threatening than the barbiturate-alcohol interaction.

5. Existing United States landfills are rapidly approaching the limits of their capacity. Landfills can leach toxins into groundwater, polluting it. Instead of creating more landfills, solid-waste managers should recycle as much trash as possible and then incinerate the remainder. This will keep future environmental damage to a minimum.

   Which of the following is an assumption on which the argument made above is based?

   (A) Future landfills will pollute the environment more than do those that already exist.
   (B) After existing landfills reach the limit of their capacity, they are closed, and the leaching of toxins from these sites decreases.
   (C) Reducing the volume of trash through recycling will not lessen future environmental danger unless the remaining trash is subsequently incinerated.
   (D) The environmental damage caused by the proposed incineration of trash would be less than that caused by the leaching of toxins from new landfills into groundwater.
   (E) No new landfill sites can be found in order to increase the total capacity of landfills in the United States.

6. According to a 1980 survey, ten percent of all United States citizens over the age of sixteen are functionally illiterate. Therefore, if the projection that there will be 250 million United States citizens over sixteen in the year 2000 is correct, we project that 25 million of these citizens will be functionally illiterate.

   Which of the following, if true, would most weaken the conclusion drawn by the author of the passage above?

   (A) The percentage of high school graduates who do not go on to college has grown steadily over the past two decades.
   (B) From 1975 to 1980 there was a three-percent decrease in the rate of functional illiteracy among United States citizens over the age of sixteen.
   (C) Many United States citizens included in the 1980 survey would also be included in a survey conducted in the year 2000.
   (D) Surveys that are improperly designed usually provide inaccurate results.
   (E) In 1980 sixty-five percent of all United States citizens were over the age of sixteen.

GO ON TO THE NEXT PAGE.

Questions 7-13

In an office there are exactly seven employees—N, P, Q, R, S, T, and U. An employee can pass along any memoranda written by that employee as well as any memoranda received from others, but only according to specific rules:

Memoranda can be passed in either direction between P and Q, in either direction between R and U, and in either direction between S and T.
Memoranda can be passed from N to S, from Q to R, from S to P, from U to N, and from U to Q.

7. Which of the seven employees can pass memoranda directly to the greatest number of employees?

(A) N
(B) Q
(C) R
(D) S
(E) U

8. If a memorandum written by P is to reach S, and is to be passed to no more employees than necessary, it must be passed to a total of how many employees other than P and S?

(A) 1
(B) 2
(C) 3
(D) 4
(E) 5

9. A memorandum from Q that eventually reaches T must have been passed to all of the following employees EXCEPT

(A) N
(B) P
(C) R
(D) S
(E) U

10. If R is absent from the office for a day, it is still possible for a memorandum to be passed on that day all the way along a route from

(A) N to Q
(B) P to S
(C) P to U
(D) Q to S
(E) T to U

11. If S is absent from the office for a day, which of the following employees CANNOT receive any memoranda from any other employee on that day?

(A) N
(B) P
(C) Q
(D) R
(E) T

12. A memorandum can travel along two alternative routes that have no employees in common except the writer and the final recipient if the writer and the final recipient, respectively, are

(A) P and R
(B) P and T
(C) Q and T
(D) S and U
(E) U and P

13. A memorandum being passed along which of the following routes must reach each of the seven employees at least once?

(A) N to P and then to U
(B) R to Q and then to T
(C) T to Q and then to U
(D) U to P and then to S
(E) U to T and then to N

GO ON TO THE NEXT PAGE.

Questions 14-19

A gardener has to plant exactly four varieties of flowers in a flower bed, one variety in each of four rows in an ascending order of height from the first row to the fourth row. The seven varieties available to the gardener are, in ascending order of height, red begonias, pink petunias, orange marigolds, red geraniums, white snapdragons, yellow zinnias, and pink cosmos. The following restrictions on color arrangements apply:

No two varieties of the same color can be planted.
Orange flowers cannot be planted in a row immediately adjacent to a row of yellow flowers.

14. Which of the following is a color arrangement, from first row to fourth row, that the gardener can select for the flower bed?

(A) Pink, red, white, pink
(B) Pink, orange, white, red
(C) Red, orange, yellow, pink
(D) Red, white, yellow, pink
(E) Red, pink, yellow, white

15. If the gardener plants the geraniums in the third row and the snapdragons in the fourth row, then which of the following must also be planted?

(A) The begonias and the petunias
(B) The begonias and the marigolds
(C) The petunias and the marigolds
(D) The petunias and the zinnias
(E) The petunias and the cosmos

16. If the gardener plants the zinnias in the third row, then which of the following can be planted in the second row?

(A) The begonias
(B) The petunias
(C) The marigolds
(D) The geraniums
(E) The cosmos

17. Flowers of which of the following colors CANNOT be planted in the third row?

(A) Orange
(B) Pink
(C) Red
(D) White
(E) Yellow

18. If the gardener plants the begonias and the petunias, then which of the following must also be planted?

(A) The marigolds
(B) The geraniums
(C) The snapdragons
(D) The zinnias
(E) The cosmos

19. If the gardener does not plant any red flowers, then the total number of acceptable arrangements of the flower garden is

(A) one
(B) two
(C) three
(D) four
(E) five

GO ON TO THE NEXT PAGE.

Questions 20-22

Exactly seven people—Q, R, S, T, X, Y, and Z—serve on an advisory board. Q, R, S, and T have been elected to the board, and X, Y, and Z have been appointed to the board. Three-person or four-person panels are sometimes drawn from the board to study proposals. Each panel must include at least one elected and at least one appointed board member, but no panel can consist of equal numbers of elected and appointed members. Each panel is chaired by a person who is a member of the group of board members (elected or appointed) whose representatives are in the minority on that panel. Any panel must also conform to the following conditions:

If Q serves on a panel, T cannot serve on that panel.
If R serves on a panel, X cannot serve on that panel.
T and Y cannot serve on a panel unless they serve together.
If Z serves on a panel, X must also serve on that panel.

20. Which of the following could be a panel drawn from the advisory board?

(A) Q, R, S
(B) S, X, Z
(C) T, Y, Z
(D) Q, S, T, Y
(E) R, T, X, Y

21. If R serves on a panel, it must be true that

(A) it is a three-person panel
(B) it is a four-person panel
(C) R chairs the panel
(D) T chairs the panel
(E) Y chairs the panel

22. Each of the following could chair a panel EXCEPT

(A) S
(B) T
(C) X
(D) Y
(E) Z

23. On the basis of figures it compiles, a citizens' group argues that congressional members of Party X authorize the spending of more taxpayer dollars than do congressional members of Party Y. The group's figures are based on an analysis of the number of spending bills for which members of Congress vote.

The figures of the citizens' group will be unreliable as a gauge of which party in Congress spends more taxpayer dollars if which of the following is true?

(A) The group weighs all votes for spending bills equally, no matter how much taxpayer money is involved in each bill.
(B) The group counts votes for all spending bills, including bills concerning the salaries of members of Congress.
(C) Most spending bills that are introduced in Congress are passed by Congress.
(D) Most spending bills that members of Party X vote for are written and sponsored by members of Party X.
(E) All spending bills, before being voted on by Congress, must be approved by committees in which members of both parties participate.

GO ON TO THE NEXT PAGE.

24. Statistics over four consecutive years showed that four percent more automobile accidents happened in California during the week following the switch to daylight saving time and during the week following the switch back to standard time than occurred the week before each event. These statistics show that these time changes adversely affect the alertness of California drivers.

The conclusion in the argument above is based on which of the following assumptions?

(A) Drivers in California as well as those in the rest of the United States have similar driving patterns.
(B) The observed increases in accident rates are due almost entirely to an increase in the number of minor accidents.
(C) Four years is not a sufficiently long period of time over which to judge the phenomenon described.
(D) There are no other factors such as school vacations or holiday celebrations that cause accident rates to rise during these weeks.
(E) A time change at any other time of year would not produce a similar increase in accident rates.

25. Since 1945 there have been numerous international confrontations as tense as those that precipitated the Second World War, and yet no large-scale conflict has resulted. To explain this, some argue that fear of enormous destruction such as the Second World War produced has had a dramatic deterrent effect.

Which of the following, if true, most seriously weakens the deterrent theory mentioned above?

(A) After the First World War, the fear of great future destruction was as intense as it was after the Second World War.
(B) Psychologists have determined that the fear of retaliation tends to temper aggressiveness among human beings.
(C) The Second World War was far less destructive than most people generally believe.
(D) Fear of repeating the levels of destruction that the Second World War produced is as pervasive today as it was forty years ago.
(E) Many of the international confrontations that have occurred since 1945 have involved countries that participated in the Second World War.

SECTION 6

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Because no comprehensive ------- exist regarding personal reading practices, we do not know, for example, the greatest number of books read in an individual lifetime.

   (A) records
   (B) instincts
   (C) remedies
   (D) proposals
   (E) commercials

2. In our corporation there is a ------- between male and female ------- because 73 percent of the men and 34 percent of the women polled believe that our company provides equal compensation to men and women.

   (A) contrast. . stereotypes
   (B) difference. . perceptions
   (C) variation. . salaries
   (D) resemblance. . employees
   (E) similarity. . aspirations

3. The wonder of De Quincey is that although opium dominated his life, it never ------- him; indeed, he turned its use to ------- when he published the story of its influence in the *London Magazine*.

   (A) overcame. . altruism
   (B) intimidated. . triumph
   (C) distressed. . pleasure
   (D) conquered. . gain
   (E) released. . necessity

4. The reduction of noise has been ------- in terms of ------- its sources, but the alternative of canceling noise out by adding sound with the opposite wave pattern may be more useful in practice.

   (A) justified. . diffusing
   (B) accomplished. . tracking
   (C) conceived. . concealing
   (D) explained. . isolating
   (E) approached. . eliminating

5. While Parker is very outspoken on issues she cares about, she is not -------; she concedes the ------- of opposing arguments when they expose weaknesses inherent in her own.

   (A) fickle. . validity
   (B) arrogant. . restraint
   (C) fanatical. . strength
   (D) congenial. . incompatibility
   (E) unyielding. . speciousness

6. Hampshire's assertions, far from showing that we can ------- the ancient puzzles about objectivity, reveal the issue to be even more ------- than we had thought.

   (A) adapt. . pressing
   (B) dismiss. . relevant
   (C) rediscover. . unconventional
   (D) admire. . elusive
   (E) appreciate. . interesting

7. Usually the first to spot data that were inconsistent with other findings, in this particular experiment she let a number of ------- results slip by.

   (A) inaccurate
   (B) verifiable
   (C) redundant
   (D) salient
   (E) anomalous

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. TORNADO : AIR ::
   (A) whirlpool : water
   (B) sinkhole : ground
   (C) forest : fire
   (D) gusher : oil
   (E) thunderbolt : lightning

9. SINGER : CHOIR :: (A) flower : bouquet
   (B) leaf : forest (C) flute : reed
   (D) line : sculpture (E) rhythm : time

10. PIGMENT : COLOR :: (A) sizing : fabric
    (B) spice : flavor (C) steel : alloy
    (D) fertilizer : soil (E) rock : energy

11. LABYRINTH : TORTUOUS ::
    (A) ornament : decorative (B) editorial : refutable
    (C) portrait : accurate (D) poster : startling
    (E) pageant : retrospective

12. PRATE : SPEAK :: (A) digress : conclude
    (B) probe : examine (C) soar : travel
    (D) wheedle : coax (E) saunter : walk

13. PERTURB : SERENITY ::
    (A) caress : affection
    (B) protect : security
    (C) harangue : bombast
    (D) annoy : consideration
    (E) reassure : doubt

14. FURTIVE : STEALTH ::
    (A) loquacious : intelligence
    (B) immoral : contrition
    (C) pontifical : reverence
    (D) whimsical : caprice
    (E) arduous : endurance

15. TENDER : ACCEPTANCE ::
    (A) publish : wisdom
    (B) exhibit : inspection
    (C) scrutinize : foresight
    (D) authorize : approval
    (E) declare : observation

16. PLUTOCRACY : WEALTH ::
    (A) democracy : freedom
    (B) aristocracy : land
    (C) gerontocracy : age
    (D) technocracy : ability
    (E) autocracy : birth

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Traditional research has confronted only Mexican and United States interpretations of Mexican-American culture. Now we must also examine the culture as we Mexican Americans have experienced it, passing from a sovereign people to compatriots with newly arriving settlers to, finally, a conquered people—a charter minority on our own land.

When the Spanish first came to Mexico, they intermarried with and absorbed the culture of the indigenous Indians. This policy of colonization through acculturation was continued when Mexico acquired Texas in the early 1800's and brought the indigenous Indians into Mexican life and government. In the 1820's, United States citizens migrated to Texas, attracted by land suitable for cotton. As their numbers became more substantial, their policy of acquiring land by subduing native populations began to dominate. The two ideologies clashed repeatedly, culminating in a military conflict that led to victory for the United States. Thus, suddenly deprived of our parent culture, we had to evolve uniquely Mexican-American modes of thought and action in order to survive.

17. The author's purpose in writing this passage is primarily to

(A) suggest the motives behind Mexican and United States intervention in Texas
(B) document certain early objectives of Mexican-American society
(C) provide a historical perspective for a new analysis of Mexican-American culture
(D) appeal to both Mexican and United States scholars to give greater consideration to economic interpretations of history
(E) bring to light previously overlooked research on Mexican Americans

18. The author most probably uses the phrase "charter minority" (lines 6-7) to reinforce the idea that Mexican Americans

(A) are a native rather than an immigrant group in the United States
(B) played an active political role when Texas first became part of the United States
(C) recognized very early in the nineteenth century the need for official confirmation of their rights of citizenship
(D) have been misunderstood by scholars trying to interpret their culture
(E) identify more closely with their Indian heritage than with their Spanish heritage

19. According to the passage, a major difference between the colonization policy of the United States and that of Mexico in Texas in the 1800's was the

(A) degree to which policies were based on tradition
(B) form of economic interdependency between different cultural groups
(C) number of people who came to settle new areas
(D) treatment of the native inhabitants
(E) relationship between the military and the settlers

20. Which of the following statements most clearly contradicts the information in this passage?

(A) In the early 1800's, the Spanish committed more resources to settling California than to developing Texas.
(B) While Texas was under Mexican control, the population of Texas quadrupled, in spite of the fact that Mexico discouraged immigration from the United States.
(C) By the time Mexico acquired Texas, many Indians had already married people of Spanish heritage.
(D) Many Mexicans living in Texas returned to Mexico after Texas was annexed by the United States.
(E) Most Indians living in Texas resisted Spanish acculturation and were either killed or enslaved.

GO ON TO THE NEXT PAGE.

This passage was adapted from an article published in 1982.

Until about five years ago, the very idea that peptide hormones might be made anywhere in the brain besides the hypothalamus was astounding. Peptide hormones, scientists thought, were made by endocrine glands and the hypothalamus was thought to be the brains' only endocrine gland. What is more, because peptide hormones cannot cross the blood-brain barrier, researchers believed that they never got to any part of the brain other than the hypothalamus, where they were simply produced and then released into the bloodstream.

But these beliefs about peptide hormones were questioned as laboratory after laboratory found that antiserums to peptide hormones, when injected into the brain, bind in places other than the hypothalamus, indicating that either the hormones or substances that cross-react with the antiserums are present. The immunological method of detecting peptide hormones by means of antiserums, however, is imprecise. Cross-reactions are possible and this method cannot determine whether the substances detected by the antiserums really are the hormones, or merely close relatives. Furthermore, this method cannot be used to determine the location in the body where the detected substances are actually produced.

New techniques of molecular biology, however, provide a way to answer these questions. It is possible to make specific complementary DNA's (cDNA's) that can serve as molecular probes to seek out the messenger RNA's (mRNA's) of the peptide hormones. If brain cells are making the hormones, the cells will contain these mRNA's. If the products the brain cells make resemble the hormones but are not identical to them, then the cDNA's should still bind to these mRNA's, but should not bind as tightly as they would to mRNA's for the true hormones. The cells containing these mRNA's can then be isolated and their mRNA's decoded to determine just what their protein products are and how closely the products resemble the true peptide hormones.

The molecular approach to detecting peptide hormones using cDNA probes should also be much faster than the immunological method because it can take years of tedious purifications to isolate peptide hormones and then develop antiserums to them. Roberts, expressing the sentiment of many researchers, states: "I was trained as an endocrinologist. But it became clear to me that the field of endocrinology needed molecular biology input. The process of grinding out protein purifications is just too slow."

If, as the initial tests with cDNA probes suggest, peptide hormones really are made in the brain in areas other than the hypothalamus, a theory must be developed that explains their function in the brain. Some have suggested that the hormones are all growth regulators, but Rosen's work on rat brains indicates that this cannot be true. A number of other researchers propose that they might be used for intercellular communication in the brain.

21. Which of the following titles best summarizes the passage?

(A) Is Molecular Biology the Key to Understanding Intercellular Communication in the Brain?
(B) Molecular Biology: Can Researchers Exploit Its Techniques to Synthesize Peptide Hormones?
(C) The Advantages and Disadvantages of the Immunological Approach to Detecting Peptide Hormones
(D) Peptide Hormones: How Scientists Are Attempting to Solve Problems of Their Detection and to Understand Their Function
(E) Peptide Hormones: The Role Played by Messenger RNA's in Their Detection

22. The passage suggests that a substance detected in the brain by use of antiserums to peptide hormones may

(A) have been stored in the brain for a long period of time
(B) play no role in the functioning of the brain
(C) have been produced in some part of the body other than the brain
(D) have escaped detection by molecular methods
(E) play an important role in the functioning of the hypothalamus

23. According to the passage, confirmation of the belief that peptide hormones are made in the brain in areas other than the hypothalamus would force scientists to

(A) reject the theory that peptide hormones are made by endocrine glands
(B) revise their beliefs about the ability of antiserums to detect peptide hormones
(C) invent techniques that would allow them to locate accurately brain cells that produce peptide hormones
(D) search for techniques that would enable them to distinguish peptide hormones from their close relatives
(E) develop a theory that explains the role played by peptide hormones in the brain

GO ON TO THE NEXT PAGE.

24. Which of the following is mentioned in the passage as a drawback of the immunological method of detecting peptide hormones?

(A) It cannot be used to detect the presence of growth regulators in the brain.
(B) It cannot distinguish between the peptide hormones and substances that are very similar to them.
(C) It uses antiserums that are unable to cross the blood-brain barrier.
(D) It involves a purification process that requires extensive training in endocrinology.
(E) It involves injecting foreign substances directly into the bloodstream.

25. The passage implies that, in doing research on rat brains, Rosen discovered that

(A) peptide hormones are used for intercellular communication
(B) complementary DNA's do not bind to cells producing peptide hormones
(C) products closely resembling peptide hormones are not identical to peptide hormones
(D) some peptide hormones do not function as growth regulators
(E) antiserums cross-react with substances that are not peptide hormones

26. Which of the following is a way in which the immunological method of detecting peptide hormones differs from the molecular method?

(A) The immunological method uses substances that react with products of hormone-producing cells, whereas the molecular method uses substances that react with a specific component of the cells themselves.
(B) The immunological method has produced results consistent with long-held beliefs about peptide hormones, whereas the molecular method has produced results that upset these beliefs.
(C) The immunological method requires a great deal of expertise, whereas the molecular method has been used successfully by nonspecialists.
(D) The immunological method can only be used to test for the presence of peptide hormones within the hypothalamus, whereas the molecular method can be used throughout the brain.
(E) The immunological method uses probes that can only bind with peptide hormones, whereas the molecular method uses probes that bind with peptide hormones and substances similar to them.

27. The idea that the field of endocrinology can gain from developments in molecular biology is regarded by Roberts with

(A) incredulity
(B) derision
(C) indifference
(D) pride
(E) enthusiasm

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. ORIENT: (A) hasten (B) defile (C) menace (D) confuse (E) decline

29. UNIMPEACHABLE:
(A) irritable (B) preventable
(C) unused to conflict (D) open to question
(E) available for discussion

30. EXPEND: (A) proceed toward (B) take away (C) place upon (D) hold to (E) store up

31. SEAMY:
(A) decent and respectable
(B) jagged and irregular
(C) strict and authoritarian
(D) ornate and adorned
(E) subtle and dangerous

32. LUCID: (A) unrecognized (B) limited (C) murky (D) improbable (E) inconsistent

33. LASSITUDE:
(A) a fear of discovery
(B) a feeling of vigor
(C) a twinge of embarrassment
(D) a want of seriousness
(E) a sense of superiority

34. HALLMARK:
(A) grave defect
(B) valueless object
(C) unfortunate incident
(D) uncharacteristic feature
(E) untimely event

35. DIATRIBE: (A) sermon (B) discourse (C) eulogy (D) lecture (E) oration

36. SEDULITY:
(A) lack of industriousness
(B) abundance of supporters
(C) contradiction of doctrine
(D) rejection of analysis
(E) depletion of resources

37. APPOSITE: (A) malevolent (B) implicit (C) disorganized (D) avoidable (E) irrelevant

FOR GENERAL TEST 21 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 3			Section 6		
Number	Answer	P+	Number	Answer	P+
1	D	93	1	A	98
2	C	78	2	B	74
3	A	65	3	D	66
4	B	72	4	E	59
5	D	65	5	C	59
6	A	53	6	B	64
7	C	41	7	E	31
8	D	92	8	A	84
9	D	88	9	A	89
10	E	78	10	B	76
11	E	46	11	A	51
12	B	57	12	E	42
13	A	54	13	E	35
14	C	40	14	D	28
15	B	38	15	B	21
16	C	21	16	C	25
17	D	43	17	C	79
18	E	82	18	A	76
19	C	47	19	D	69
20	A	39	20	E	48
21	B	62	21	D	68
22	E	50	22	C	64
23	A	39	23	E	43
24	C	45	24	B	70
25	C	39	25	D	70
26	E	16	26	A	41
27	D	49	27	E	58
28	D	92	28	D	87
29	E	85	29	D	61
30	C	75	30	E	67
31	D	71	31	A	60
32	C	37	32	C	62
33	E	34	33	B	50
34	B	42	34	D	45
35	E	26	35	C	36
36	D	33	36	A	29
37	D	39	37	E	25
38	E	29			

QUANTITATIVE ABILITY					
Section 1			Section 4		
Number	Answer	P+	Number	Answer	P+
1	D	93	1	A	92
2	A	84	2	C	92
3	B	83	3	B	82
4	D	74	4	D	83
5	B	79	5	C	89
6	D	72	6	C	78
7	C	71	7	A	79
8	A	67	8	B	78
9	C	71	9	C	74
10	A	73	10	B	70
11	A	55	11	A	72
12	C	53	12	B	63
13	B	49	13	D	61
14	A	44	14	D	44
15	C	36	15	B	38
16	C	82	16	C	84
17	E	81	17	A	83
18	C	76	18	D	77
19	B	77	19	D	66
20	A	66	20	E	69
21	D	87	21	E	85
22	E	66	22	C	58
23	C	59	23	C	48
24	C	59	24	E	57
25	E	29	25	A	39
26	A	53	26	B	76
27	C	50	27	B	54
28	B	36	28	A	44
29	B	31	29	E	39
30	D	22	30	E	36

ANALYTICAL ABILITY					
Section 2			Section 5		
Number	Answer	P+	Number	Answer	P+
1	A	83	1	A	86
2	E	77	2	D	85
3	B	68	3	C	62
4	E	76	4	E	83
5	C	42	5	D	77
6	D	67	6	B	52
7	C	61	7	E	75
8	D	44	8	D	53
9	A	91	9	B	74
10	C	87	10	A	58
11	C	28	11	E	75
12	E	86	12	E	35
13	C	30	13	E	25
14	B	53	14	D	61
15	D	39	15	C	68
16	C	52	16	D	49
17	B	55	17	B	46
18	C	47	18	C	53
19	C	76	19	B	39
20	B	59	20	B	58
21	A	42	21	E	18
22	E	29	22	E	19
23	D	37	23	A	34
24	E	43	24	D	56
25	D	42	25	A	48

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 21 ONLY AND THE PERCENTS BELOW*

Raw Score	Scaled Scores and Percents Below						Raw Score	Scaled Scores and Percents Below					
	Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below		Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below
72-75	800	99					40	460	44	560	49	700	90
71	790	99					39	450	41	550	48	680	87
							38	440	38	530	42	670	85
70	780	99					37	430	36	520	40	660	83
69	760	99					36	420	33	510	37	640	79
68	750	98											
67	740	98					35	410	30	500	35	630	76
66	730	97					34	410	30	490	32	620	74
							33	400	26	480	30	600	69
65	720	96					32	390	24	470	28	590	67
64	710	95					31	380	22	460	26	580	64
63	690	94											
62	680	93					30	370	20	450	24	560	58
61	670	92					29	370	20	440	22	550	55
							28	360	16	430	20	530	49
60	660	90	800	97			27	350	14	420	18	520	46
59	650	89	800	97			26	350	14	410	16	510	43
58	640	87	800	97									
57	630	85	800	97			25	340	12	400	14	490	38
56	620	84	780	94			24	330	10	390	13	480	35
							23	320	9	380	12	460	31
55	610	82	770	93			22	310	7	370	10	450	27
54	600	80	750	89			21	290	5	360	9	440	24
53	590	78	740	88									
52	580	76	720	84			20	280	4	350	7	420	20
51	570	74	710	82			19	270	3	340	6	410	18
							18	260	2	330	5	390	15
50	560	72	690	78	800	99	17	250	1	320	5	380	13
49	540	67	680	77	800	99	16	240	1	310	4	360	10
48	530	64	660	72	800	99	15	230	1	300	3	350	9
47	520	61	650	70	800	99							
46	520	61	640	68	780	98	14	220	0	290	2	330	6
							13	210	0	280	2	310	4
45	500	56	620	63	770	97	12	200	0	260	1	300	4
44	490	54	610	61	750	96	11	200	0	240	1	280	2
43	480	51	600	59	740	95	10	200	0	230	0	260	1
42	470	48	580	54	720	92							
41	460	44	570	51	710	91	9	200	0	210	0	240	1
							8	200	0	200	0	220	0
							0-7	200	0	200	0	200	0

*Percent scoring below the scaled score based on the performance of 923,359 examinees who took the General Test between October 1, 1986, and September 30, 1989.

TEST 22

SECTION 1

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. There is perhaps some truth in that waggish old definition of a scholar—a siren that calls attention to a fog without doing anything to ------ it.

   (A) describe
   (B) cause
   (C) analyze
   (D) dispel
   (E) thicken

2. Cryogenic energy storage has the advantage of being suitable in any ------, regardless of geography or geology, factors that may ------- both underground gas storage and pumped hydroelectric storage.

   (A) location..limit (B) climate..deter
   (C) site..forebode (D) proportion..typify
   (E) surface..hamper

3. The newborn human infant is not a passive figure, nor an active one, but what might be called an actively ------ one, eagerly attentive as it is to sights and sounds.

   (A) adaptive (B) selective (C) inquisitive
   (D) receptive (E) intuitive

4. Opponents of the expansion of the market economy, although in ------, continued to constitute ------- political force throughout the century.

   (A) error..an inconsequential
   (B) retreat..a powerful
   (C) disarray..a disciplined
   (D) jeopardy..an ineffective
   (E) command..a viable

5. Nature's energy efficiency often ------ human technology: despite the intensity of the light fireflies produce, the amount of heat is negligible; only recently have humans developed chemical light-producing systems whose efficiency ------- the firefly's system.

   (A) engenders..manipulates
   (B) reflects..simulates
   (C) outstrips..rivals
   (D) inhibits..matches
   (E) determines..reproduces

6. Scholars' sense of the uniqueness of the central concept of "the state" at the time when political science became an academic field quite naturally led to striving for a correspondingly ------- mode of study.

   (A) thorough
   (B) distinctive
   (C) dependable
   (D) scientific
   (E) dynamic

7. Just as astrology was for centuries ------ faith, countering the strength of established churches, so today believing in astrology is an act of ------- the professional sciences.

   (A) an individual..rebellion by
   (B) an accepted..antagonism toward
   (C) an underground..defiance against
   (D) a heretical..support for
   (E) an unknown..concern about

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. DEPORT : NATION ::
   (A) expel : school
   (B) boycott : store
   (C) confine : prison
   (D) colonize : frontier
   (E) quarantine : hospital

9. VESSEL : BLOOD :: (A) tank : oil
   (B) sewer : plumbing (C) sprinkler : water
   (D) compressor : air (E) pipeline : gas

10. ITINERARY : TRIP ::
    (A) lottery : chance
    (B) signal : light
    (C) agenda : meeting
    (D) railroad : transportation
    (E) university : education

11. TACT : OFFENSIVE :: (A) manners : sincere
    (B) money : poor (C) speech : illiterate
    (D) wine : sober (E) friends : cheerful

12. EPIDERMIS : MAMMAL :: (A) blanket : bed
    (B) root : plant (C) topsoil : farm
    (D) bark : conifer (E) bread : sandwich

13. ANOMALY : PARADIGMATIC ::
    (A) membrane : impenetrable
    (B) weakness : durable
    (C) blemish : flawless
    (D) fallacy : convincing
    (E) liability : solvent

14. LIONIZE : ADMIRE ::
    (A) authorize : betray
    (B) aggrandize : envy
    (C) exonerate : suspect
    (D) vituperate : despise
    (E) emulate : belittle

15. TERSENESS : SUPERFLUOUS ::
    (A) randomness : observable
    (B) elegance : simple
    (C) arbitrariness : just
    (D) spontaneity : studied
    (E) flexibility : stable

16. SUBMISSION : OBEISANCE ::
    (A) dilemma : frustration
    (B) fear : foreboding
    (C) boredom : listlessness
    (D) modesty : blush
    (E) affection : embrace

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Our visual perception depends on the reception of energy reflecting or radiating from that which we wish to perceive. If our eyes could receive and measure infinitely delicate sense-data, we could perceive the world with infinite precision. The natural limits of our eyes have, of course, been extended by mechanical instruments; telescopes and microscopes, for example, expand our capabilities greatly. There is, however, an ultimate limit beyond which no instrument can take us; this limit is imposed by our inability to receive sense-data smaller than those conveyed by an individual quantum of energy. Since these quanta are believed to be indivisible packages of energy and so cannot be further refined, we reach a point beyond which further resolution of the world is not possible. It is like a drawing a child might make by sticking indivisible discs of color onto a canvas.

We might think that we could avoid this limitation by using quanta with extremely long wavelengths; such quanta would be sufficiently sensitive to convey extremely delicate sense-data. And these quanta would be useful, as long as we only wanted to measure energy, but a completely accurate perception of the world will depend also on the exact measurement of the lengths and positions of what we wish to perceive. For this, quanta of extremely long wavelengths are useless. To measure a length accurately to within a millionth of an inch, we must have a measure graduated in millionths of an inch; a yardstick graduated in inches is useless. Quanta with a wavelength of one inch would be, in a sense, measures that are graduated in inches. Quanta of extremely long wavelength are useless in measuring anything except extremely large dimensions.

Despite these difficulties, quanta have important theoretical implications for physics. It used to be supposed that, in the observation of nature, the universe could be divided into two distinct parts, a perceiving subject and a perceived object. In physics, subject and object were supposed to be entirely distinct, so that a description of any part of the universe would be independent of the observer. The quantum theory, however, suggests otherwise, for every observation involves the passage of a complete quantum from the object to the subject, and it now appears that this passage constitutes an important coupling between observer and observed. We can no longer make a sharp division between the two in an effort to observe nature objectively. Such an attempt at objectivity would distort the crucial interrelationship of observer and observed as parts of a single whole. But, even for scientists, it is only in the world of atoms that this new development makes any appreciable difference in the explanation of observations.

17. The primary purpose of the passage is to
    (A) discuss a problem that hinders precise perception of the world
    (B) point out the inadequacies of accepted units of measurement
    (C) criticize attempts to distinguish between perceiving subjects and perceived objects
    (D) compare and contrast rival scientific hypotheses about how the world should be measured and observed
    (E) suggest the limited function of sensory observation

18. According to the passage, quanta with an extremely long wavelength cannot be used to give complete information about the physical world because they
    (A) exist independently of sense-data
    (B) are graduated only in inches
    (C) have an insignificant amount of energy
    (D) cannot, with present-day instruments, be isolated from quanta of shorter wavelength
    (E) provide an insufficiently precise means of measuring length and position

GO ON TO THE NEXT PAGE.

19. Which of the following describes a situation most analogous to the situation discussed in lines 9-13 ?

(A) A mathematician can only solve problems the solution of which can be deduced from known axioms.
(B) An animal can respond to no command that is more complicated syntactically than any it has previously received.
(C) A viewer who has not learned, at least intuitively, the conventions of painting, cannot understand perspective in a drawing.
(D) A sensitized film will record no detail on a scale that is smaller than the grain of the film.
(E) A shadow cast on a screen by an opaque object will have a sharp edge only if the light source is small or very distant.

20. The author uses the analogy of the child's drawing (lines 17-19) primarily in order to

(A) illustrate the ultimate limitation in the precision of sense-data conveyed by quanta
(B) show the sense of helplessness scientists feel in the face of significant observational problems
(C) anticipate the objections of those scientists who believe that no instrumental aid to observation is entirely reliable
(D) exemplify the similarities between packages of energy and varieties of color
(E) disparage those scientists who believe that measurement by means of quanta offers an accurate picture of the world

21. The author implies that making a sharp division between subject and object in physics is

(A) possible in a measurement of an object's length and position, but not in a measurement of its energy
(B) still theoretically possible in the small-scale world of atoms and electrons
(C) possible in the case of observations involving the passage of a complete quantum
(D) no longer an entirely accurate way to describe observation of the universe
(E) a goal at which scientists still aim

22. The author's use of the phrase "in a sense" (line 34) implies which of the following?

(A) Quanta of extremely long wavelength are essentially graduated in inches.
(B) Quanta of one-inch wavelength are not precisely analogous to yardsticks graduated in inches.
(C) Quanta of extremely long wavelength, in at least one respect, resemble quanta of shorter wavelength.
(D) Quanta of one-inch wavelength and quanta of extremely long wavelength do not differ only in their wavelengths.
(E) Quanta of one-inch wavelength must be measured by different standards than quanta of extremely long wavelength.

23. According to the passage, the quantum theory can be distinguished from previous theories of physics by its

(A) insistence on scrupulously precise mathematical formulations
(B) understanding of the inherent interrelationship of perceiver and perceived
(C) recognition of the need for sophisticated instruments of measurement
(D) emphasis on small-scale rather than on large-scale phenomena
(E) regard for philosophical issues as well as for strictly scientific ones

GO ON TO THE NEXT PAGE.

Tillie Olsen's fiction and essays have been widely and rightly acknowledged as major contributions to American literature. Her work has been particularly valued by contemporary feminists. Yet few of Olsen's readers realize the extent to which her vision and choice of subject are rooted in an earlier literary heritage—the tradition of radical political thought, mostly socialist and anarchist, of the 1910's and 1920's, and the Old Left tradition of the 1930's. I do not mean that one can adequately explain the eloquence of her work in terms of its political origins, or that left-wing politics were the single most important influence on it. My point is that its central consciousness—its profound understanding of class and gender as shaping influences on people's lives—owes much to that earlier literary heritage, a heritage that, in general, has not been sufficiently valued by most contemporary literary critics.

24. The primary purpose of the passage is to
    (A) argue that Olsen's understanding of class and gender is her greatest gift as a writer
    (B) acknowledge Olsen's importance as the leading spokesperson for a radical literary heritage
    (C) point out a literary heritage to which Olsen's work is related
    (D) urge literary critics to investigate the origins of a literary heritage
    (E) suggest that Olsen's work has been placed in a literary heritage to which it does not belong

25. According to the author, which of the following is true of the heritage mentioned in the passage?
    (A) It emphasizes gender as the determinate influence on people's lives.
    (B) It has been the most important influence on Olsen's work.
    (C) It includes political traditions that span three decades of the twentieth century.
    (D) It explains the eloquence but not the subject matter of Olsen's work.
    (E) It reflects primarily the development of socialist political thought in the early twentieth century.

26. In the sentence "I do not . . . influence on it" (lines 10-14), the author does which of the following?
    (A) Broadens an existing classification.
    (B) Contradicts the passage's central thesis.
    (C) Qualifies a commonly accepted point of view.
    (D) Presents conflicting explanations for a phenomenon.
    (E) Denies possible interpretations of an earlier assertion.

27. According to the author, Olsen's work has been
    (A) rightly acknowledged for its contribution to political thought
    (B) thought to represent the beginning of a new literary tradition
    (C) a needed impetus for social change
    (D) most clearly influenced by feminism
    (E) deservedly admired by readers

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. ASCEND: (A) go down (B) take apart (C) overturn (D) conceal (E) return

29. POROUS: (A) inadmissible (B) intractable (C) impermeable (D) impalpable (E) implacable

30. AFFILIATION:
(A) mismanagement
(B) predisposition
(C) dissociation
(D) disagreement
(E) acquaintance

31. INADVERTENCE:
(A) strong character
(B) collective action
(C) careful attention
(D) unpleasant feature
(E) unhesitating obedience

32. BOLSTER: (A) condense (B) undermine (C) disprove (D) cancel (E) misinterpret

33. CATALYZE: (A) distort (B) cool (C) refine (D) contaminate (E) inhibit

34. WAFFLE: (A) discharge (B) construct (C) insist harshly (D) praise repeatedly (E) speak unequivocally

35. DISCRETE:
(A) continuous
(B) external
(C) highly developed
(D) illogically composed
(E) properly described

36. LACONIC: (A) blithe (B) incapable (C) flagrant (D) garrulous (E) intransigent

37. DECOROUS: (A) unlikely (B) uncomfortable (C) unrepentant (D) unseemly (E) unattractive

38. INCIPIENT: (A) exuberant (B) full-bodied (C) explicit (D) plentiful (E) full-blown

SECTION 2

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

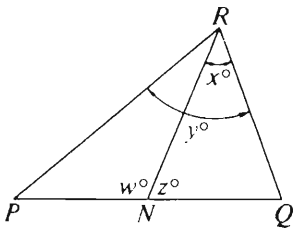
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

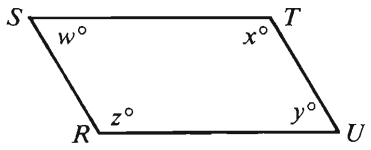


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	$3 + \sqrt{49}$	$8 + \sqrt{9}$



RSTU is a parallelogram.

2.	$z + w$	$y + x$

$x + y = 5$
$x - 3 = 2$

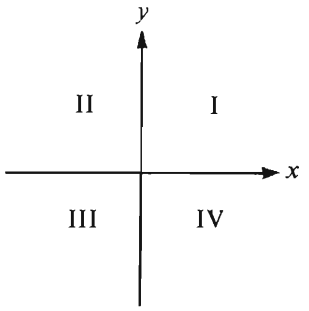
3.	x	y

4.	2 more than $\frac{1}{3}$ of 6	2 less than $\frac{2}{3}$ of 6

x is the greatest even integer less than 7.
y is the least odd integer greater than 2.

5.	$\frac{x}{y}$	3.5

	Column A	Column B



$(x, 4)$ is a point (not shown) in region II.
$(5, y)$ is a point (not shown) in region IV.

6.	x	y
7.	$\frac{5}{6} - \frac{2}{9}$	$\frac{2}{3} - \frac{1}{6}$

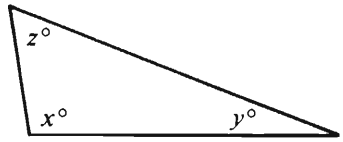
$x < 0$

8.	$x^2 - 5$	5

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B

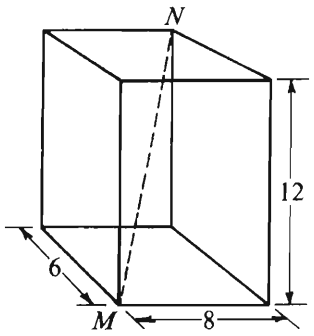


The average (arithmetic mean) of x and y is 60.

9.	z	60
10.	100^2	2^{100}

For all nonzero numbers x and y, $x \boxdot y$ is defined by the equation $x \boxdot y = \frac{x+y}{y}$.

11.	$3 \boxdot 4$	$4 \boxdot 3$



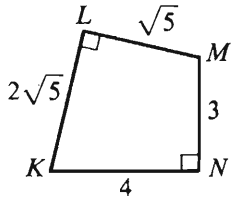
All faces of the solid above are rectangular.

12.	The length of diagonal MN	15

	Column A	Column B

n is a positive integer and $(-1)^n = -1$.

13.	n	2



14.	The area of quadrilateral region $KLMN$	12

Jill has $6x$ red marbles and $4y$ green marbles. Bill has half as many red marbles as Jill, but he has twice as many red marbles and green marbles combined as Jill.

15.	The number of green marbles that Bill has	$9x + 8y$

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Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

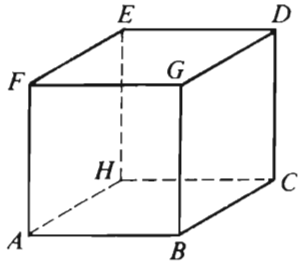
16. If $ax + by = 10$, then $2ax + 2by =$

(A) 5 (B) 12 (C) 14 (D) 20 (E) 40

Member	Votes
Ann	18
Betty	7
Charles	3
David	8

17. The chart above shows the results of an election in which four members of club X ran for president. If there were 40 members in club X, what percent of the membership did NOT vote?

(A) 4% (B) 10% (C) 11%
(D) 20% (E) 36%



18. Which of the following statements must be true about the cube above?

I. Plane FEH is parallel to plane GDC.
II. BG is perpendicular to plane FED.
III. FE is parallel to BC.

(A) I only
(B) II only
(C) III only
(D) I and II only
(E) I, II, and III

19. $\dfrac{(0.1)\,(0.001)}{0.01} =$

(A) 0.01 (B) 0.001 (C) 0.0001
(D) 0.00001 (E) 0.000001

20. If $\dfrac{x}{y+1} = \dfrac{2}{5}$, what is y in terms of x?

(A) $\frac{2}{5}x$ (B) $\frac{2}{5}x + \frac{2}{5}$ (C) $\frac{2}{5}x + 1$
(D) $\frac{5}{2}x - \frac{2}{5}$ (E) $\frac{5}{2}x - 1$

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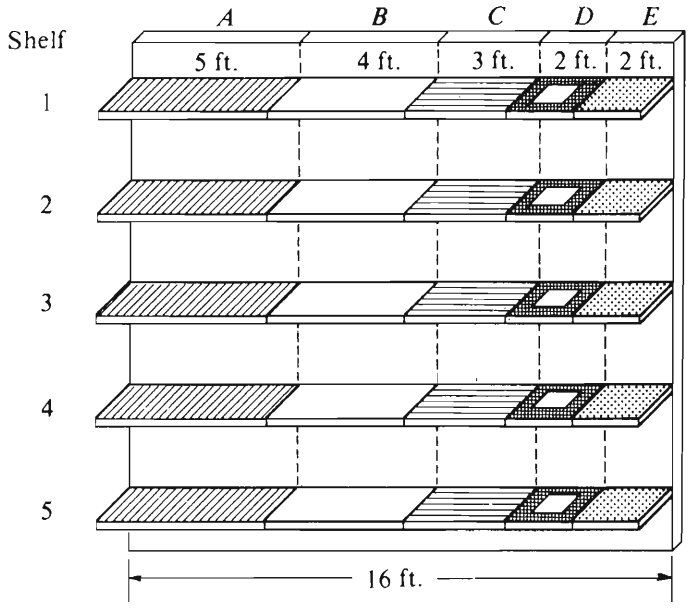
Questions 21-25 refer to the following table and graph.

AVERAGE WEEKLY SALES AND SHELF SPACE IN STORE *X*
FOR PRODUCTS FROM FIVE BAKERIES

Legend	Bakery	Average Weekly Sales	Percent of Total Average Weekly Sales	Shelf Space	Average Weekly Sales per Foot of Shelf Space
	A	$1,100		25 ft.	$44
	B		20%	20 ft.	$25
	C	$300	12%		
	D	$350	14%	10 ft.	
	E			10 ft.	$25
Total		$2,500	100%		

DISTRIBUTION OF SHELF SPACE
FOR FIVE BAKERIES IN STORE *X*



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21. What is the total amount of shelf space that Bakery C has in Store X?

(A) 3 ft. (B) 12 ft. (C) 15 ft.
(D) 16 ft. (E) 20 ft.

22. What is the amount of average weekly sales per foot of shelf space for Bakery D?

(A) \$21.88
(B) \$25.00
(C) \$30.00
(D) \$35.00
(E) \$49.00

23. Bakery E's average weekly sales are what percent of the total average weekly sales of products from the five bakeries in Store X?

(A) 10% (B) 14% (C) 15% (D) 25%
(E) It cannot be determined from the information given.

24. If the shelf space for Bakeries A and B were reversed and their average weekly sales per foot remained the same, then the total average weekly sales would do which of the following?

(A) Decrease by \$220.
(B) Decrease by \$95.
(C) Remain unchanged.
(D) Increase by \$125.
(E) Increase by \$345.

25. In Store X, shelf 1 accounted for $\frac{1}{4}$ of Bakery C's average weekly sales and shelf 2 accounted for $\frac{2}{3}$ as much as shelf 1. If shelves 3 and 4 each accounted for less than shelf 2, but together accounted for more than shelf 1, then which of the following could have been the average weekly sales of shelf 5 for Bakery C?

(A) \$40
(B) \$65
(C) \$80
(D) \$110
(E) \$125

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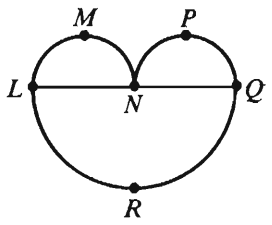

26. In the figure above, arcs LMN and NPQ are semicircles of the same size. If arc LRQ is also a semicircle and the length of line segment NQ is 5, what is the area of semicircular region LRQ?

(A) $\frac{25}{8}\pi$ (B) $\frac{25}{4}\pi$ (C) 10π

(D) $\frac{25}{2}\pi$ (E) 25π

27. City Y has installed 30 parking meters at 15-foot intervals along a straight street. What is the number of feet between the first meter and the last meter?

(A) 200 (B) 420 (C) 435
(D) 450 (E) 465

28. A company paid \$500,000 in merit raises to employees whose performances were rated A, B, or C. Each employee rated A received twice the amount of the raise that was paid to each employee rated C; each employee rated B received $1\frac{1}{2}$ times the amount of the raise that was paid to each employee rated C. If 50 workers were rated A, 100 were rated B, and 150 were rated C, how much was the raise paid to each employee rated A?

(A) \$370
(B) \$625
(C) \$740
(D) \$1,250
(E) \$2,500

29. What is the number of squares of perimeter 36 into which a rectangle with width 36 and length 72 can be partitioned?

(A) 2 (B) 4 (C) 8 (D) 32 (E) 72

$$11 \times 13 \times 17 \times 19 \times 23$$

30. A decrease of 1 in which of the factors above would result in the greatest decrease in the product?

(A) 11 (B) 13 (C) 17 (D) 19 (E) 23

SECTION 3

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-4

A shopkeeper is preparing a single shipment of candies to be packed in boxes X and Y. In each box, the shopkeeper will pack three of seven packages of candy—jellybeans, licorice, nougats, peppermints, rock candy, sourballs, and toffee. The boxes must be packed according to the following directions:

The jellybeans must be included in the shipment and they must be packed in box X.

The licorice must be included in the shipment and it must be packed in box Y.

The sourballs can neither be packed in the same box as the licorice nor in the same box as the peppermint.

The nougat and the toffee must be included in the shipment and must be packed together in one box.

1. Which of the following combinations of candy packages can be packed in box X ?
   (A) Jellybeans, rock candy, sourballs
   (B) Jellybeans, nougat, rock candy
   (C) Jellybeans, peppermint, toffee
   (D) Jellybeans, licorice, sourballs
   (E) Licorice, nougat, toffee

2. Which of the following combinations of candy packages can be packed in box Y ?
   (A) Licorice, peppermint, rock candy
   (B) Licorice, peppermint, sourballs
   (C) Licorice, sourballs, toffee
   (D) Jellybeans, licorice, rock candy
   (E) Licorice, nougat, peppermint

3. If toffee is packed in box X, which of the following pairs of candy packages must be packed in box Y ?
   (A) Nougat and peppermint
   (B) Peppermint and rock candy
   (C) Jellybeans and licorice
   (D) Rock candy and sourballs
   (E) Nougat and sourballs

4. If the toffee is packed in box Y, which of the following pairs of candy packages can be packed in box X ?
   (A) Nougat and peppermint
   (B) Nougat and rock candy
   (C) Nougat and sourballs
   (D) Peppermint and sourballs
   (E) Rock candy and sourballs

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* 5. During the War of 1812, the United States Congress licensed privateers (armed pirates) who were empowered to plunder enemy ships. Those privateers financed their ventures through the sale of the seized cargo. A Florida man has petitioned Congress to license modern privateers to mount a private "war-for-profit" against seagoing smugglers of illegal drugs.

Which of the following, if true, is a drawback to the Florida man's proposal?

(A) Modern ships are much faster than those of the nineteenth century.
(B) Although the United States Constitution still authorizes the licensing of privateers, no licenses have been issued for over 150 years.
(C) Modern privateers would be unable to finance their operations by selling the seized cargo without being in violation of the law.
(D) The 1812 privateers were plundering ships that belonged to citizens of another country.
(E) Most of the ships used by drug smugglers are modified fishing boats.

6. Dense snow cover can cause unusually harsh weather patterns to persist. If a severe winter storm blankets the Great Plains, the snow cover reflects the sun's radiation back into space and thus keeps the temperature of the ground low. Consequently, cold air moving down from Canada remains cold enough to cause more snowstorms.

Which of the following is a conclusion that can be properly drawn from the information above?

(A) Winter weather on the Great Plains is the product of unusual movements of air masses.
(B) The Great Plains are more likely than other areas to suffer unusually harsh weather patterns.
(C) If the Great Plains get more snow than usual early in the winter and the snow remains until the spring thaw, the winter is likely to be colder than usual.
(D) Even if the temperatures on the Great Plains are not extremely cold but are just below freezing, a moderate snowstorm will probably turn into a blizzard.
(E) The temperature of the ground depends primarily on the thickness of the snow cover.

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Questions 7-12

The manager of a radio program is going to feature six vocalists—M, N, P, Q, R, and S—on her half-hour radio show during the course of one week. She will feature one vocalist on the show each day from Monday through Saturday. The manager must schedule the vocalists for the show according to the following conditions:

M must be featured earlier in the week than R.
P must be featured on Tuesday.
Q must be featured on the day immediately before or immediately after the day on which N is featured.

7. If N is to be featured on Thursday, the earliest day on which R can be featured is

(A) Monday (B) Tuesday (C) Wednesday (D) Friday (E) Saturday

8. If S is to be featured on Friday, M must be featured on

(A) Monday (B) Tuesday (C) Wednesday (D) Thursday (E) Saturday

9. If Q is to be featured on Thursday, the latest day on which M can be featured is

(A) Monday (B) Tuesday (C) Wednesday (D) Friday (E) Saturday

10. Which of the following vocalists can be featured on Monday?

(A) N (B) P (C) Q (D) R (E) S

11. If S is to be featured on Thursday, which of the following is true?

(A) M must be featured on Wednesday.
(B) N must be featured on Saturday.
(C) Q must be featured exactly two days after R is featured.
(D) R must be featured on Wednesday.
(E) R must be featured later in the week than S.

12. If S is to be featured on Friday, what is the total number of acceptable schedules available to the manager?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

GO ON TO THE NEXT PAGE.

Questions 13-18

A certain group of eight people is made up of two women—S and T; three men—U, V, and W; and three children—X, Y, and Z. Each of the eight must be on one, and only one, of three teams being formed according to the following conditions:

Each team must have either two or three members.
Each team must have at least one child.
S and X cannot be on the same team.
V and W cannot be on the same team.
U and Y must be on the same team.

13. If U is on the same team as V, which of the following pairs must be on a team together?
    (A) S and Y
    (B) S and Z
    (C) T and W
    (D) T and Y
    (E) W and X

14. If S is on the same team as Y, which of the following could be true?
    (A) U is on a team with only one other member.
    (B) T is on a team with only one other member.
    (C) T is on the same team as V.
    (D) W is on the same team as Y.
    (E) Z is on the same team as U.

15. If the two women are on a team together, which of the following must be on a team with only one other member?
    (A) U (B) V (C) W (D) X (E) Z

16. If two of the men are on a team together, which of the following must be on a team that has three members?
    (A) S (B) T (C) V (D) W (E) Y

17. If S is on the same team as U, which of the following could be true?
    (A) The two women are on a team together.
    (B) Two of the men are on a team together.
    (C) S is on a team with V.
    (D) T is on a team with Z.
    (E) U is on a team with W.

18. If one man is on each team, any of the following pairs could be together on a team EXCEPT
    (A) S and T
    (B) S and W
    (C) T and U
    (D) T and W
    (E) V and Z

GO ON TO THE NEXT PAGE.

Questions 19-21

From exactly seven objects—R, S, T, U, X, Y, and Z—a group of exactly four objects must be selected in accordance with the following conditions:

If R is selected, T must also be selected.
If S is selected, U must also be selected.
If X and Y are both selected together, T cannot be selected.

19. If X and Y are both selected together, which of the following must also be selected?

(A) R
(B) S
(C) T
(D) U
(E) Z

20. If S and Z are both selected together, each of the following could also be selected EXCEPT

(A) R
(B) T
(C) U
(D) X
(E) Y

21. If U is not selected, which of the following can be, but does not have to be, selected?

(A) R
(B) S
(C) T
(D) X
(E) Z

Questions 22-23

No botanist lives long enough to study the complete life cycle of an individual California redwood tree. Nevertheless, by observing many trees at different stages, botanists can piece together the evolution of a single tree. Exactly the same principle applies in astronomy to the study of the life story of globular clusters, huge spherical aggregations of about a million stars all swarming about each other.

22. Which of the following is an assumption made in the passage above?

(A) The methods of scientists in one field generally carry over to other fields even if the subject matter is vastly different.
(B) Observations of the life cycle of a single individual have little value in scientific studies.
(C) Globular clusters at different stages of development are accessible to astronomers for observation and study.
(D) There are globular clusters that have not so far been detected by astronomers.
(E) Redwoods and globular clusters must both be studied intensively now, while they still exist in sufficient numbers.

23. Which of the following studies is most similar, in terms of both the problem posed by the time dimension and the method of coping with that problem, to the studies of botanists and astronomers alluded to in the passage above?

(A) A study of the annual growth cycle of the sugar maple whose method is to analyze many different individual trees in an effort to derive a composite picture
(B) A study analyzing the progression of lakes from their formation to their end as peat bogs whose method is to examine lakes at many different stages of this progression
(C) A study charting developments in automotive engineering whose method is to contrast comparable models from many different years
(D) A study of the impact of computers on industrial society whose method is to monitor the degree of computerization by calculating several significant indices every three years
(E) A study of an extinct creature's skeletal development whose method is to compare the extant skeletons of individuals that died at different ages

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24. Consider three fish swimming together in a school. The space within which each fish can be seen by predator Y is defined by a sphere centered on the fish and having a radius that is the maximum distance Y can see. The school is vulnerable to attack when Y is within one of the three spheres. The spheres overlap to a great extent, since the fish are in a compact group.

Which of the following is a reliable inference to be drawn from the passage above?

(A) The vulnerability to attack of the school as a whole is not much greater than the vulnerability to attack of any one fish in the school.
(B) There is less chance that predator Y will attack a school of four fish than that it will attack a school of three fish.
(C) Fish who swim in schools are less likely to be devoured by predators than are fish who do not swim in schools.
(D) The maximum distance at which an individual fish is visible depends less on the size of the fish than on whether the fish is swimming in a school.
(E) The maximum distance at which predator Y can see its prey is increased if Y is itself swimming in a school of Y's.

25. In respectable periodicals, books are given reviewing space in inverse proportion to the likely size of their sales. Airport and supermarket bookstalls stock only books that are expected to sell in large numbers. Consequently, those who buy books at such bookstalls have to do so without any guidance whatever from the book reviewers whose work is published in respectable periodicals.

Which of the following is a valid criticism of the argument above?

(A) Bookstalls like those found at airports and in supermarkets are designed to induce people to buy books on impulse.
(B) The assortment of books available at airport bookstalls is different from the assortment of books available at supermarket bookstalls.
(C) The fact that a book is expected to sell well does not guarantee that actual sales will be large.
(D) Many who later come to be respected as book reviewers start their careers by writing for trashy magazines.
(E) The conclusion that respectable periodicals never publish reviews of projected best-sellers is unwarranted.

SECTION 4

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Despite the fact that the two council members belonged to different political parties, they ------ the issue of how to finance the town debt.

   (A) complicated (B) avoided
   (C) attested to (D) reported on
   (E) agreed on

2. The breathing spell provided by the ------ arms shipments should give all the combatants a chance to reevaluate their positions.

   (A) plethora of
   (B) moratorium on
   (C) reciprocation of
   (D) concentration on
   (E) development of

3. The notion that cultural and biological influences ------ determine cross-cultural diversity is discredited by the fact that, in countless aspects of human existence, it is cultural programming that overwhelmingly accounts for cross-population variance.

   (A) jointly (B) completely (C) directly
   (D) equally (E) eventually

4. Because medieval women's public participation in spiritual life was not welcomed by the male establishment, a compensating ------ religious writings, inoffensive to the members of the establishment because of its ------, became important for many women.

   (A) involvement with..privacy
   (B) attention to..popularity
   (C) familiarity with..scarcity
   (D) dissatisfaction with..profundity
   (E) resistance to..domesticity

5. This final essay, its prevailing kindliness ------ by occasional flashes of savage irony, bespeaks the ------ character of the author.

   (A) illuminated..imperturbable
   (B) marred..dichotomous
   (C) untainted..vindictive
   (D) exemplified..chivalrous
   (E) diluted..ruthless

6. Although his attempts to appear psychotic were so ------ as to be almost ------, there is evidence that Ezra Pound was able to avoid standing trial for treason merely by faking symptoms of mental illness.

   (A) spontaneous..amusing
   (B) contrived..believable
   (C) clumsy..ludicrous
   (D) stylized..distressing
   (E) sporadic..premeditated

7. The ------ questions that consistently structure the study of history must be distinguished from merely ------ questions, which have their day and then pass into oblivion.

   (A) recurrent..practical
   (B) instinctive..factual
   (C) ingrained..discriminating
   (D) philosophical..random
   (E) perennial..ephemeral

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. CLIENTELE : CUSTOMERS ::
   (A) army : civilians
   (B) boycott : merchants
   (C) contest : umpires
   (D) testimony : lawyers
   (E) faculty : teachers

9. ARTICULATE : SPEECH ::
   (A) meticulous : power
   (B) graceful : movement
   (C) dissenting : thought
   (D) fawning : respect
   (E) engaging : acceptance

10. COLOSSUS : FIGURINE :: (A) epic : grandeur (B) sculptor : statue (C) squirrel : chipmunk (D) boulder : pebble (E) sofa : bench

11. LEAF : OAK :: (A) bulb : tulip (B) berry : fruit (C) tree : forest (D) stem : flower (E) needle : pine

12. LATENCY : RESPONSE ::
   (A) term : pregnancy
   (B) incubation : disease
   (C) interval : periodicity
   (D) duration : process
   (E) fluctuation : equilibrium

13. RETRACT : STATEMENT ::
   (A) substantiate : pledge
   (B) reiterate : belief
   (C) reveal : promise
   (D) precipitate : procedure
   (E) repeal : legislation

14. JUGGERNAUT : CRUSH ::
   (A) quisling : betray
   (B) incubus : hatch
   (C) sphinx : destroy
   (D) sibyl : mislead
   (E) paragon : purify

15. FRUGAL : PENURIOUS ::
   (A) temperate : sober
   (B) ethical : unscrupulous
   (C) cynical : sarcastic
   (D) compliant : obsequious
   (E) loathsome : malevolent

16. DEPART : ABSCOND :: (A) store : secrete (B) close : occlude (C) speak : harangue (D) intervene : interfere (E) cover : eclipse

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Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Currently, the paramount problem in the field of biomaterials, the science of replacing diseased tissue with human-made implants, is control over the interface, or surface, between implanted biomaterials and living tissues. The physical properties of most tissues can be matched by careful selection of raw materials: metals, ceramics, or several varieties of polymer materials. Even the requirement that biomaterials processed from these materials be nontoxic to host tissue can be met by techniques derived from studying the reactions of tissue cultures to biomaterials or from short-term implants. But achieving necessary matches in physical properties across interfaces between living and nonliving matter requires knowledge of which molecules control the bonding of cells to each other—an area that we have not yet explored thoroughly. Although recent research has allowed us to stabilize the tissue-biomaterial interface by controlling either the chemical reactions or the microstructure of the biomaterials, our fundamental understanding of how implant devices adhere to tissues remains woefully incomplete.

17. According to the passage, the major problem currently facing scientists in the field of biomaterials is
    (A) assessing and regulating the bonding between host tissue and implants
    (B) controlling the transfer of potentially toxic materials across the interface of tissue and implant
    (C) discovering new materials from which to construct implant devices
    (D) deciding in what situations implants are needed
    (E) determining the importance of short-term implants to long-term stability of tissue-implant interfaces

18. The passage suggests which of the following about the recent research mentioned in lines 19-25?
    (A) It has solved one set of problems but has created another.
    (B) It has concentrated on secondary concerns but has ignored primary concerns.
    (C) It has improved practical applications of biomaterial technology without providing a complete theoretical explanation of that improvement.
    (D) It has thoroughly investigated properties of biomaterials but has paid little attention to relevant characteristics of human tissue.
    (E) It has provided considerable information on short-term implant technology but little on long-term implant technology.

19. The author's primary purpose is to
    (A) answer a theoretical question in the field of biomaterials
    (B) discuss the current state of technology in the field of biomaterials
    (C) resolve a research dispute in the field of biomaterials
    (D) predict an ethical crisis for biomaterials researchers
    (E) suggest some practical benefits of biomaterial implants

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Islamic law is a particularly instructive example of "sacred law." Islamic law is a phenomenon so different from all other forms of law—notwithstanding, of course, a considerable and inevitable number of coincidences with one or the other of them as far as subject matter and positive enactments are concerned—that its study is indispensable in order to appreciate adequately the full range of possible legal phenomena. Even the two other representatives of sacred law that are historically and geographically nearest to it, Jewish law and Roman Catholic canon law, are perceptibly different.

Both Jewish law and canon law are more uniform than Islamic law. Though historically there is a discernible break between Jewish law of the sovereign state of ancient Israel and of the Diaspora (the dispersion of Jewish people after the conquest of Israel), the spirit of the legal matter in later parts of the Old Testament is very close to that of the Talmud, one of the primary codifications of Jewish law in the Diaspora. Islam, on the other hand, represented a radical breakaway from the Arab paganism that preceded it; Islamic law is the result of an examination, from a religious angle, of legal subject matter that was far from uniform, comprising as it did the various components of the laws of pre-Islamic Arabia and numerous legal elements taken over from the non-Arab peoples of the conquered territories. All this was unified by being subjected to the same kind of religious scrutiny, the impact of which varied greatly, being almost nonexistent in some fields, and in others originating novel institutions. This central duality of legal subject matter and religious norm is additional to the variety of legal, ethical, and ritual rules that is typical of sacred law.

In its relation to the secular state, Islamic law differed from both Jewish and canon law. Jewish law was buttressed by the cohesion of the community, reinforced by pressure from outside; its rules are the direct expression of this feeling of cohesion, tending toward the accommodation of dissent. Canon and Islamic law, on the contrary, were dominated by the dualism of religion and state, where the state was not, in contrast with Judaism, an alien power but the political expression of the same religion. But the conflict between state and religion took different forms; in Christianity it appeared as the struggle for political power on the part of a tightly organized ecclesiastical hierarchy, and canon law was one of its political weapons. Islamic law, on the other hand, was never supported by an organized institution; consequently, there never developed an overt trial of strength. There merely existed discordance between application of the sacred law and many of the regulations framed by Islamic states; this antagonism varied according to place and time.

20. The author's purpose in comparing Islamic law to Jewish law and canon law is most probably to
    (A) contend that traditional legal subject matter does not play a large role in Islamic law
    (B) support his argument that Islamic law is a unique kind of legal phenomenon
    (C) emphasize the variety of forms that can all be considered sacred law
    (D) provide an example of how he believes comparative institutional study should be undertaken
    (E) argue that geographical and historical proximity does not necessarily lead to parallel institutional development

21. The passage provides information to answer which of the following questions?
    (A) Does Islamic law depend on sources other than Arab legal principles?
    (B) What secular practices of Islamic states conflicted with Islamic law?
    (C) Are Jewish law and canon law the most typical examples of sacred law?
    (D) Is Jewish law more uniform than canon law?
    (E) What characterized Arab law of the pre-Islamic era?

22. According to the passage, which of the following statements about sacred law is correct?
    (A) The various systems of sacred law originated in a limited geographical area.
    (B) The various systems of sacred law have had marked influence on one another.
    (C) Systems of sacred law usually rely on a wide variety of precedents.
    (D) Systems of sacred law generally contain prescriptions governing diverse aspects of human activity.
    (E) Systems of sacred law function most effectively in communities with relatively small populations.

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23. It can be inferred from the passage that the application of Islamic law in Islamic states has

(A) systematically been opposed by groups who believe it is contrary to their interests
(B) suffered irreparably from the lack of firm institutional backing
(C) frequently been at odds with the legal activity of government institutions
(D) remained unaffected by the political forces operating alongside it
(E) benefited from the fact that it never experienced a direct confrontation with the state

24. Which of the following most accurately describes the organization of the passage?

(A) A universal principle is advanced and then discussed in relation to a particular historical phenomenon.
(B) A methodological innovation is suggested and then examples of its efficacy are provided.
(C) A traditional interpretation is questioned and then modified to include new data.
(D) A general opinion is expressed and then supportive illustrations are advanced.
(E) A controversial viewpoint is presented and then both supportive evidence and contradictory evidence are cited.

25. The passage implies that the relationship of Islamic, Jewish, and canon law is correctly described by which of the following statements?

I. Because each constitutes an example of sacred law, they necessarily share some features.
II. They each developed in reaction to the interference of secular political institutions.
III. The differences among them result partly from their differing emphasis on purely ethical rules.

(A) I only
(B) III only
(C) I and II only
(D) II and III only
(E) I, II, and III

26. The passage suggests that canon law differs from Islamic law in that only canon law

(A) contains prescriptions that nonsacred legal systems might regard as properly legal
(B) concerns itself with the duties of a person in regard to the community as a whole
(C) was affected by the tension of the conflict between religion and state
(D) developed in a political environment that did not challenge its fundamental existence
(E) played a role in the direct confrontation between institutions vying for power

27. All of the following statements about the development of Islamic law are implied in the passage EXCEPT:

(A) Pre-Islamic legal principles were incorporated into Islamic law with widely differing degrees of change.
(B) Diverse legal elements were joined together through the application of a purely religious criterion.
(C) Although some of the sources of Islamic law were pagan, its integrity as a sacred law was not compromised by their incorporation.
(D) There was a fundamental shared characteristic in all pre-Islamic legal matter taken over by Islamic law.
(E) Although Islam emerged among the Arabs, Islamic law was influenced by ethnically diverse elements.

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. ASEPTIC: (A) contaminated (B) dispersed (C) oxidized (D) persistent (E) haphazard

29. QUIESCENCE: (A) impartiality (B) subtlety (C) indictment (D) rationality (E) action

30. LUMBER: (A) align (B) squelch (C) swerve (D) resist (E) glide

31. NUCLEATE: (A) displace (B) scatter (C) preserve (D) smother (E) deactivate

32. LEVITY: (A) veracity (B) audacity (C) felicity (D) gravity (E) depravity

33. DENUNCIATION: (A) suspension (B) indecision (C) eulogy (D) catharsis (E) pronouncement

34. TREACHEROUSNESS: (A) intellectuality (B) faithfulness (C) noteworthiness (D) pleasantness (E) consideration

35. SOPORIFIC:
(A) artificial nourishment
(B) hallucinatory experience
(C) effective cure
(D) auxiliary
(E) stimulant

36. STYMIE: (A) entreat (B) apprise (C) foster (D) lend credibility (E) change direction

37. MUNDANE: (A) unearthly (B) synthetic (C) costly (D) fragile (E) complicated

38. WELTER:
(A) orderly arrangement
(B) convincing remark
(C) inconclusive meeting
(D) luxuriant growth
(E) eccentric character

SECTION 5

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

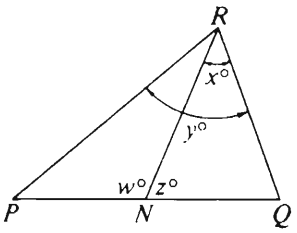
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.



Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	$2(1 + 0)$	$(2 + 1) \cdot 0$

Room	R	S
Dimensions of Rectangular Floor	12 meters by 20 meters	12 meters by 18 meters
Cost (per square meter) for Wall-to-Wall Carpeting	\$8	\$9

	Column A	Column B
2.	The cost of wall-to-wall carpeting for room R	The cost of wall-to-wall carpeting for room S

$R = \{3, 5, 8, 9\}$
$T = \{1, 7, 8, 9\}$

	Column A	Column B
3.	The sum of the numbers in R that are also in T	The sum of the numbers that are in T

$$\frac{8}{2} = 1 + \frac{a}{3}$$

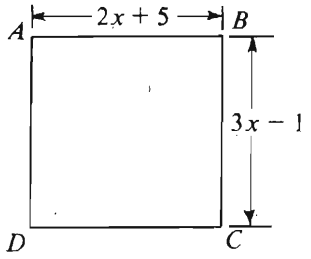
$$\frac{6}{2} = 1 + \frac{b}{3}$$

	Column A	Column B
4.	$\frac{a}{b}$	$\frac{b}{a}$

	Column A	Column B
5.	The area of a tablecloth that overhangs a square tabletop by 3 inches on all sides	The area of a tablecloth that overhangs a rectangular tabletop by 2 inches on all sides
6.	37,652	$3(10^4) + 7(10^3) + 6(10^2) + 5(10) + 2$

$$m^2 + 8m + 7 = 0$$

	Column A	Column B
7.	m	1



$ABCD$ is a square.

	Column A	Column B
8.	x	5

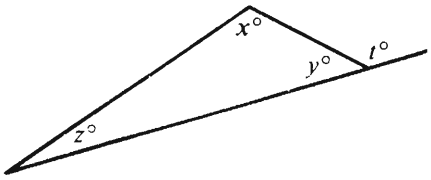
GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
9.	For year Y, the ratio of the number of Mondays in May to twice the number of Fridays in May	$\frac{1}{2}$

$$\frac{yz + xz + xy}{xyz} = \frac{16}{17}$$

	Column A	Column B
10.	$\frac{1}{x} + \frac{1}{y} + \frac{1}{z}$	$\frac{17}{16}$



	Column A	Column B
11.	t	$x + z$

	Column A	Column B
	A certain recipe called for $3\frac{3}{4}$ cups of flour. Betty used 30 percent more flour than the recipe called for.	
12.	The number of cups of flour Betty used in making the recipe	$4\frac{7}{8}$

$$x > 0 > y$$

	Column A	Column B
13.	$(x + 1)y$	$x(y - 1)$

Rectangle R has an area of 60 square units and a perimeter of 64 units. The length of the shortest side of R is x and the length of the longest side of R is y.

	Column A	Column B
14.	$\frac{x}{y}$	$\frac{1}{15}$

x and y are positive numbers and $\sqrt{x + y} = \sqrt{x} + 1$.

	Column A	Column B
15.	y	$2\sqrt{x} + 1$

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. If 9 is $\frac{3}{4}$ of n, what number is $\frac{5}{6}$ of n?

(A) 10
(B) 12
(C) 14.4
(D) 15
(E) 27

Distribution	Number of Sets
0 boys 2 girls	30
1 boy 1 girl	50
2 boys 0 girls	20

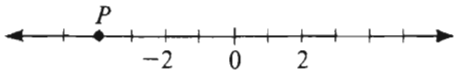
17. In the table above, the sex distribution of a group of 100 sets of twins is given. How many girls are in this group?

(A) 50 (B) 60 (C) 80
(D) 110 (E) 130

18. If $x = 3$, $y = -1$, and $z = 1$, which of the following is (are) true?

I. $x + y + z = 3$
II. $y + 2z = 2$
III. $x - 2z = 1$

(A) I only (B) III only (C) I and II only
(D) I and III only (E) I, II, and III



Note: Drawn to scale.

19. If Q is a point to the right of zero on the number line above and the distance between P and Q is 11, then the coordinate of Q is

(A) −15 (B) 7 (C) 8 (D) 11 (E) 15

20. Of the following, which is closest to $\frac{0.26 \times 397}{9.9}$?

(A) 1 (B) 10 (C) 70 (D) 100 (E) 700

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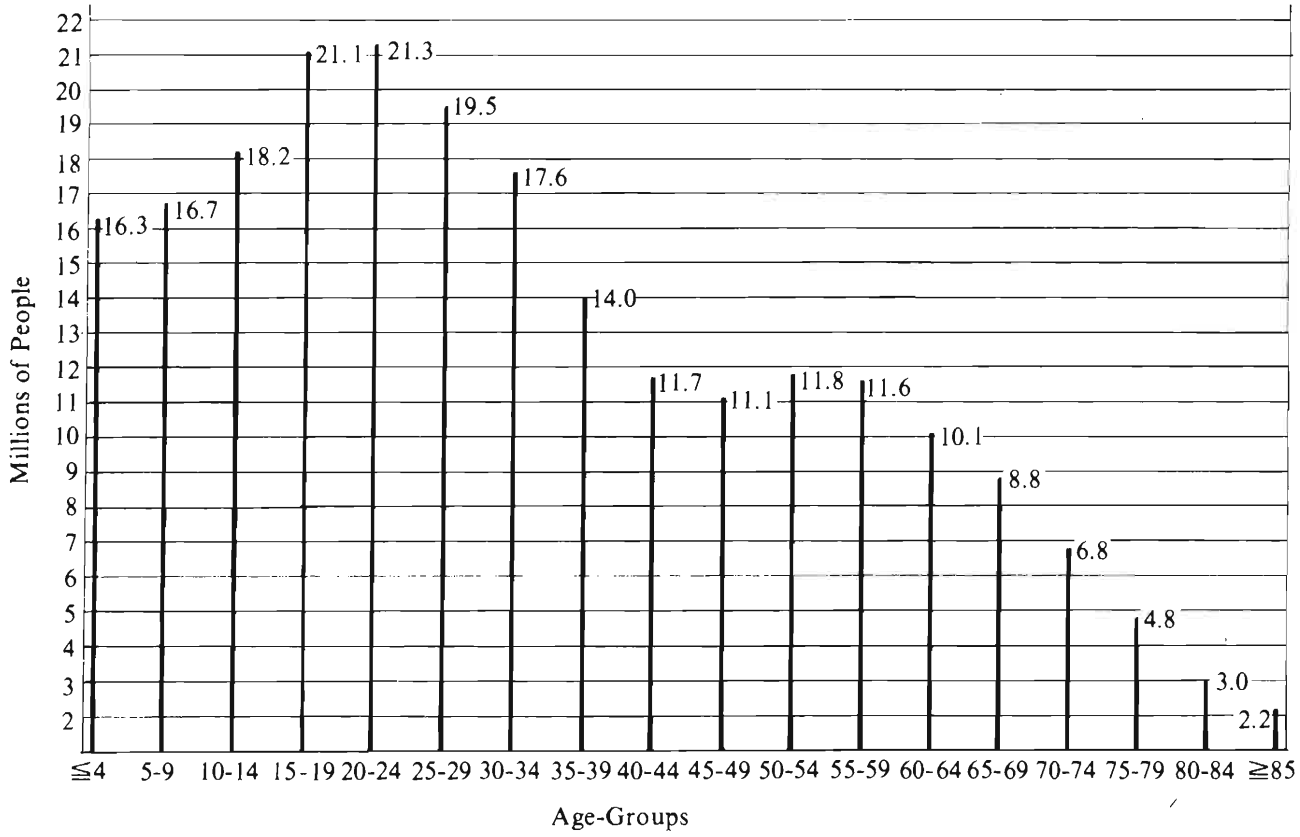
Questions 21-25 refer to the following graph.

UNITED STATES POPULATION BY AGE IN YEAR *X*

(Total population = 226.6 million)



Note: Drawn to scale

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21. In year X, how many million people in the United States were aged 55 to 64 ?

(A) 10.1 (B) 11.6 (C) 11.8
(D) 21.7 (E) 33.5

22. In year X, how many million more people in the United States were in the 20 to 24 age-group than were in the 30 to 34 age-group?

(A) 0.2 (B) 1.8 (C) 2.3
(D) 2.8 (E) 3.7

23. By approximately what percent did the population in the 10 to 14 age-group exceed the population in the 50 to 54 age-group?

(A) 6.4%
(B) 35%
(C) 54%
(D) 65%
(E) 135%

24. If there were 3.4 million people in the United States who were 36 years of age, approximately what percent of the people from 30 to 39 years of age were 36 years of age?

(A) 10% (B) 20% (C) 25%
(D) 30% (E) 35%

25. According to the graph, which of the following statements about the population of the United States in year X must be true?

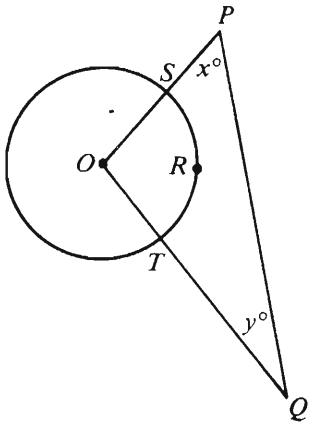
I. More people were 21 years old than any other age.
II. The ratio of the number of people in the 65 to 69 age-group to the number of people in the 70 to 74 age-group is equal to the ratio of the number of people in the 70 to 74 age-group to the number of people in the 75 to 79 age-group.
III. The 45 to 49 age-group has the fewest people.

(A) None (B) I only (C) II only
(D) I and II (E) II and III

GO ON TO THE NEXT PAGE.

26. If $xyz \neq 0$ and if $n = \frac{xz}{y}$ and $q = \frac{xy}{z}$, then $\frac{1}{nq} =$

(A) $\frac{x}{z}$ (B) $\frac{x}{y}$ (C) xyz (D) x^2 (E) $\frac{1}{x^2}$



27. In the figure above, O is the center of the circle and arc SRT has length 2π. If the circumference of the circle is 12π, what is the value of $x + y$?

(A) 60 (B) 90 (C) 120 (D) 150
(E) It cannot be determined from the information given.

28. A number is multiplied by 4 and then that product is divided by 100. This same result could be obtained by dividing the original number by

(A) 0.04 (B) 0.25 (C) 0.40
(D) 2.5 (E) 25

29. A postal clerk sold 75 stamps for a total of \$10.85. Some of the stamps were 15-cent stamps and the remainder of the stamps were 13-cent stamps. How many of the stamps were 13-cent stamps?

(A) 15
(B) 20
(C) 25
(D) 30
(E) 55

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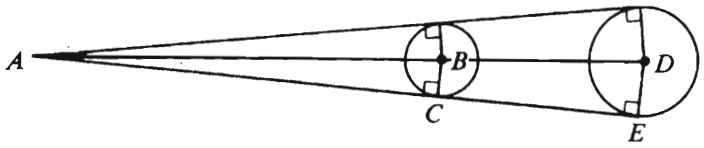

30. If B and D are centers of the circles shown in the figure above and if $BD = 12$, $BC = 2$, and $DE = 3$, then $AB =$

(A) 12 (B) 14 (C) 21 (D) 22 (E) 24

SECTION 6

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-4

An instrument has exactly six keys, each sounding a different note. The notes are K, L, M, N, O, and P. Playing this instrument involves playing successive chords, each consisting of three of the notes produced simultaneously:

Notes K and N can only be produced simultaneously.

Note L cannot be produced simultaneously with note O.

A chord can neither be the same as the one immediately before it nor be the same as the one immediately after it.

1. Each of the following is an acceptable chord EXCEPT

(A) KLP (B) KMN (C) KNP
(D) LMP (E) MOP

2. Chord LMP could be immediately followed by each of the following chords EXCEPT

(A) KLN (B) KMN (C) KNP
(D) LMP (E) MOP

3. Which of the following pairs of notes can be played simultaneously with K to produce an acceptable chord?

(A) LM (B) LO (C) LP
(D) MN (E) OP

4. Which of the following can be a sequence of two consecutive chords?

(A) KLN, KNO
(B) KMP, MNO
(C) KNO, KLO
(D) LMP, LOP
(E) MNP, MNP

GO ON TO THE NEXT PAGE.

5. Despite the fact that the health-inspection procedures for catering establishments are more stringent than those for ordinary restaurants, more of the cases of food poisoning reported to the city health department were brought on by banquets served by catering services than were brought on by restaurant meals.

Which of the following, if true, helps explain the apparent paradox in the statement above?

(A) A significantly larger number of people eat in restaurants than attend catered banquets in any given time period.
(B) Catering establishments know how many people they expect to serve, and therefore are less likely than restaurants to have, and serve, leftover food, a major source of food poisoning.
(C) Many restaurants provide catering services for banquets in addition to serving individual meals.
(D) The number of reported food-poisoning cases at catered banquets is unrelated to whether the meal is served on the caterer's or the client's premises.
(E) People are unlikely to make a connection between a meal they have eaten and a subsequent illness unless the illness strikes a group who are in communication with one another.

6. Dear Editor: Jones's new book has the potential to destroy reputations of persons who have held high governmental responsibility during national crises. However, readers should dismiss Jones's criticisms. Jones's antigovernment attitude is well known, and his criticisms will convince only those like himself, persons who have never had real responsibility and never will, and hence are not qualified to judge.

The argument above includes which of the following questionable techniques?

(A) It employs the term "responsibility" in more than one sense.
(B) It assumes that attacking the source of a claim is sufficient to disprove the claim.
(C) It assumes that the majority of people share Jones's attitude of opposition to government policies.
(D) It appeals to a person of unreliable authority as a supporter of its position.
(E) It confuses cause and effect.

7. I. Neither Peter nor Sarah has any common sense.
II. Neither Peter nor Sarah is able to run the factory.

Statement II must be true if both Statement I and which of the following statements are true?

(A) Neither Peter nor Sarah has any experience in running factories.
(B) Even a person who lacks common sense would be able to run a factory if he or she had taken courses in factory management.
(C) To be able to run a factory, a person must have common sense.
(D) Peter and Sarah, working with someone who has good common sense, would be able to run the factory.
(E) If Sarah had any common sense, she and Peter would be able to run the factory.

GO ON TO THE NEXT PAGE.

Questions 8-13

Three local companies—F, G, and H—and three out-of-state companies—X, Y, and Z—must each be scheduled for a different one of six consecutive days from Monday through Saturday to present their respective conceptions of a planned housing development to the town council.

F's presentation must be made earlier than H's presentation.

X's presentation must be made earlier than Z's presentation, but not on the day immediately preceding Z's presentation.

The three presentations by the local companies cannot all be made before any presentation by an out-of-state company is made, nor can the three presentations by the out-of-state companies all be made before any presentation by a local company is made.

8. Which of the following is a list of the six companies in an order in which they could be scheduled to make their presentations?

(A) F, H, G, X, Y, Z
(B) F, H, Z, G, Y, X
(C) G, Y, F, X, Z, H
(D) X, G, Y, F, H, Z
(E) Y, X, H, Z, G, F

9. If F's presentation is to be made on Friday, the companies making their presentations in the three-day period Monday through Wednesday must include

(A) G and X
(B) G and Y
(C) H and Z
(D) X and Y
(E) Y and Z

10. If X's presentation is to be made on Thursday, Friday's presentation must be made by either

(A) F or Y
(B) F or Z
(C) G or H
(D) G or Z
(E) H or Y

11. Which of the following is a list of all those days, and only those days, on which Z could make its presentation?

(A) Wednesday, Friday
(B) Tuesday, Thursday, Saturday
(C) Thursday, Friday, Saturday
(D) Tuesday, Wednesday, Friday, Saturday
(E) Wednesday, Thursday, Friday, Saturday

12. If F is to make its presentation after Z makes its presentation, which of the following is a day on which X could make its presentation?

(A) Tuesday
(B) Wednesday
(C) Thursday
(D) Friday
(E) Saturday

13. If H is to make its presentation on Wednesday and if Y's presentation is to be made earlier than H's presentation, then G must make its presentation on

(A) Monday
(B) Tuesday
(C) Thursday
(D) Friday
(E) Saturday

GO ON TO THE NEXT PAGE.

Questions 14-18

Seven pieces of equipment—an air compressor, a drill press, a lathe, a band saw, a hydraulic press, a spot welder, and a polisher—are to be arranged along one wall of a factory building. Each machine must be placed at one of seven electrical outlets, numbered one through seven consecutively, along that wall, according to the following conditions:

The air compressor must be placed at an outlet adjacent to the outlet at which the hydraulic press is placed.
The drill press must be placed at an outlet that is adjacent to an outlet at which either the band saw or the spot welder is placed.
The polisher cannot be placed at an outlet adjacent to the outlet at which the lathe is placed.
The lathe must be placed at outlet two.

14. Which of the following is an acceptable arrangement of equipment at outlets one through seven?
    (A) Air compressor, hydraulic press, drill press, spot welder, polisher, band saw, lathe
    (B) Drill press, band saw, air compressor, hydraulic press, lathe, spot welder, polisher
    (C) Hydraulic press, lathe, air compressor, polisher, band saw, drill press, spot welder
    (D) Spot welder, lathe, drill press, band saw, polisher, air compressor, hydraulic press
    (E) Spot welder, lathe, polisher, band saw, drill press, air compressor, hydraulic press

15. If the air compressor is placed at outlet seven, which of the following must be true?
    (A) The hydraulic press is placed at outlet five.
    (B) The drill press is placed at outlet three.
    (C) The polisher is placed at outlet five.
    (D) The band saw is placed at outlet four.
    (E) The spot welder is placed at outlet one.

16. If the spot welder is placed at outlet five, the band saw must be placed at outlet
    (A) one (B) three (C) four
    (D) six (E) seven

17. If the drill press is placed at outlet seven, which of the following must be true?
    (A) The spot welder is placed at outlet six.
    (B) The polisher is placed at outlet five.
    (C) The hydraulic press is placed at outlet four.
    (D) The air compressor is placed at outlet three.
    (E) The band saw is placed at outlet one.

18. The polisher can be placed at which of the following outlets?
    (A) One (B) Three (C) Four
    (D) Six (E) Seven

GO ON TO THE NEXT PAGE.

Questions 19-22

Classroom assignments are being made for 5 teachers—F, G, H, I, and J—and 5 assistants—K, L, M, N, and O. The classrooms are all in a line on one side of a corridor and are numbered consecutively from 1 to 6. One teacher and one assistant will be assigned to each of 5 classrooms, and one classroom will remain unassigned. The assignments must conform to the following conditions:

F is assigned to the same room as K.
G is not assigned to the same room as O.
I is assigned to either Room 2 or Room 3.
J is assigned to Room 5.
M is assigned to a room next to F's room.
The unassigned room is not either one of the end rooms.

19. M CANNOT be assigned to which of the following rooms?

(A) 1 (B) 2 (C) 3 (D) 5 (E) 6

20. If G is assigned to Room 3, which of the following must be true?

(A) F is assigned to Room 1.
(B) I is assigned to Room 2.
(C) L is assigned to Room 3.
(D) N is assigned to Room 4.
(E) O is assigned to Room 5.

21. If Room 2 is the unassigned room, which of the following could be true?

(A) G is assigned to an end room.
(B) M is assigned to an end room.
(C) M is assigned to the same room as H.
(D) G is assigned to a room next to H's room.
(E) M is assigned to a room next to I's room.

22. If G is assigned to a room next to H's room, which of the following must be true?

(A) G is assigned to Room 1.
(B) L is assigned to Room 2.
(C) O is assigned to Room 3.
(D) Room 3 is the unassigned room.
(E) Room 4 is the unassigned room.

23. If we employ a broad definition of what is urban—that is, one that includes suburbs—about 33,000 square miles of land in the United States were converted from rural to urban uses in the 1960's and 1970's. From 1960 to 1980 the area of urban settlement increased by 84 percent while the urban population increased by 33 percent.

If all of the statements above are true, which of the following must also be true?

(A) The rate of growth of the population in urban areas in the United States increased between 1960 and 1980.
(B) By 1980 the fraction of the United States population living in urban settlements built after 1960 exceeded the fraction of the population living in urban settlements built before 1960.
(C) The density of the urban population in the United States decreased between 1960 and 1980.
(D) Areas in the United States that were definitely urban before 1960 gained population at the expense of rural and formerly rural areas between 1960 and 1980.
(E) The population of rural areas decreased between 1960 and 1980.

GO ON TO THE NEXT PAGE.

24. Praising a historian for factual accuracy in describing events is like praising an architect for using well-seasoned timber or properly mixed concrete in a building.

The author of this statement is arguing that

(A) nonhistorians can appreciate well-written historical accounts, but they cannot judge the accuracy of a historian's version of events

(B) history is analogous to architecture in that both disciplines build on foundations laid by other professions

(C) a good historian must have a thorough knowledge of auxiliary sciences that help establish facts about events

(D) the credibility of a historian's argument depends on the amount of information the historian has available

(E) a historian has an obligation to be factually accurate, but accuracy is not the historian's most notable accomplishment

25. Masterpieces of literature are "intertextual"; that is, they tend to be written in response not to reality but to other works of literature. To the extent that a writing is intertextual, it becomes clouded as a mirror of social reality.

The statements above provide the most support for which of the following conclusions?

(A) To the extent that a writing fails to mirror social reality, the writing is intertextual.

(B) The author who wishes to write a masterpiece should avoid being influenced by other works of literature.

(C) A writing that is not intertextual can have no significant relationship to any other writings.

(D) Literary masterpieces of the past are suspect as sources of information about the social reality of the past.

(E) A work of literature is not intertextual if it is written in response to a writing that accurately mirrors social reality.

FOR GENERAL TEST 22 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 1			Section 4		
Number	Answer	P+	Number	Answer	P+
1	D	73	1	E	94
2	A	60	2	B	69
3	D	66	3	D	59
4	B	64	4	A	59
5	C	54	5	B	59
6	B	57	6	C	46
7	C	50	7	E	49
8	A	93	8	E	91
9	E	84	9	B	82
10	C	92	10	D	76
11	B	42	11	E	76
12	D	64	12	B	45
13	C	37	13	E	80
14	D	29	14	A	17
15	D	26	15	D	19
16	E	22	16	A	13
17	A	50	17	A	78
18	E	70	18	C	62
19	D	73	19	B	91
20	A	67	20	B	70
21	D	70	21	A	46
22	B	44	22	D	36
23	B	72	23	C	35
24	C	68	24	D	53
25	C	45	25	A	38
26	E	48	26	E	28
27	E	36	27	D	25
28	A	87	28	A	75
29	C	86	29	E	46
30	C	91	30	E	64
31	C	69	31	B	65
32	B	68	32	D	55
33	E	67	33	C	39
34	E	40	34	B	43
35	A	35	35	E	38
36	D	41	36	C	52
37	D	28	37	A	35
38	E	15	38	A	25

QUANTITATIVE ABILITY					
Section 2			Section 5		
Number	Answer	P+	Number	Answer	P+
1	B	92	1	A	93
2	C	96	2	B	78
3	A	86	3	B	87
4	A	90	4	A	81
5	B	89	5	D	85
6	D	82	6	C	79
7	A	73	7	B	77
8	D	74	8	A	68
9	C	67	9	D	59
10	B	75	10	B	56
11	B	74	11	C	61
12	A	53	12	C	51
13	D	46	13	D	50
14	B	45	14	C	33
15	C	33	15	C	29
16	D	88	16	A	83
17	B	83	17	D	78
18	E	78	18	D	83
19	A	72	19	B	87
20	E	69	20	B	73
21	C	88	21	D	91
22	D	85	22	E	94
23	A	57	23	C	31
24	B	47	24	A	70
25	C	38	25	A	51
26	D	53	26	E	59
27	C	48	27	C	44
28	E	29	28	E	43
29	D	31	29	B	42
30	A	36	30	E	39

ANALYTICAL ABILITY					
Section 3			Section 6		
Number	Answer	P+	Number	Answer	P+
1	A	88	1	A	74
2	A	80	2	D	74
3	B	72	3	D	83
4	E	82	4	A	77
5	C	88	5	E	54
6	C	51	6	B	66
7	C	65	7	C	83
8	A	81	8	D	79
9	D	44	9	A	65
10	E	83	10	C	63
11	D	62	11	E	63
12	B	57	12	A	59
13	B	50	13	D	61
14	C	52	14	D	73
15	D	35	15	C	54
16	E	34	16	A	37
17	D	49	17	B	37
18	A	39	18	E	41
19	D	14	19	E	25
20	A	41	20	B	52
21	D	17	21	A	25
22	C	39	22	E	16
23	B	53	23	C	37
24	A	30	24	E	46
25	E	24	25	D	42

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 22 ONLY AND THE PERCENTS BELOW*

Raw Score	Scaled Scores and Percents Below*						Raw Score	Scaled Scores and Percents Below*					
	Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below		Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below
72-76	800	99					40	460	45	570	52	720	93
71	790	99					39	450	42	550	48	700	90
70	770	99					38	440	39	540	45	690	89
69	760	99					37	430	36	530	43	670	85
68	750	98					36	420	34	510	38	660	84
67	740	98					35	410	30	500	35	640	80
66	720	96					34	400	27	490	33	630	77
65	710	96					33	400	27	480	30	610	73
64	700	95					32	390	25	460	26	600	70
63	690	94					31	380	23	450	24	580	65
62	680	93					30	370	21	440	22	570	62
61	670	92					29	360	17	420	18	550	57
60	650	89	800	98			28	360	17	410	16	540	53
59	640	88	800	98			27	350	15	400	15	520	47
58	630	86	800	98			26	340	13	390	13	510	44
57	620	84	790	97			25	330	11	370	10	500	42
56	610	83	770	94			24	320	10	360	9	480	36
55	600	81	760	93			23	310	8	350	8	470	33
54	590	79	750	90			22	300	7	330	6	450	28
53	580	77	730	87			21	290	5	320	5	440	25
52	570	75	720	85			20	280	4	310	4	420	21
51	560	73	710	83			19	270	3	300	3	410	19
50	550	70	700	81	800	99	18	260	2	280	2	390	15
49	540	67	680	77	800	99	17	250	2	270	2	380	13
48	530	65	670	75	800	99	16	240	1	260	1	360	10
47	520	62	660	73	800	99	15	230	1	240	1	350	9
46	510	59	640	69	800	99	14	220	1	230	1	330	6
45	500	57	630	66	790	98	13	210	0	220	0	320	6
44	490	54	620	64	770	97	12	200	0	210	0	300	4
43	480	51	610	62	760	96	11	200	0	200	0	290	3
42	470	48	590	57	740	95	10	200	0	200	0	280	3
41	460	45	580	55	730	94	9	200	0	200	0	260	2
							8	200	0	200	0	250	1
							7	200	0	200	0	230	1
							6	200	0	200	0	220	0
							0-5	200	0	200	0	200	0

*Percent scoring below the scaled score based on the performance of the 876,691 examinees who took the General Test between October 1, 1985, and September 30, 1988.

TEST 23

SECTION 1

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. The natural balance between prey and predator has been increasingly ——, most frequently by human intervention.

   (A) celebrated (B) predicted (C) observed
   (D) disturbed (E) questioned

2. There is some —— the fact that the author of a book as sensitive and informed as *Indian Artisans* did not develop her interest in Native American art until adulthood, for she grew up in a region rich in American Indian culture.

   (A) irony in (B) satisfaction in
   (C) doubt about (D) concern about
   (E) presumptuousness in

3. Ecology, like economics, concerns itself with the movement of valuable —— through a complex network of producers and consumers.

   (A) commodities (B) dividends
   (C) communications (D) nutrients
   (E) artifacts

4. Observable as a tendency of our culture is a —— of —— psychoanalysis: we no longer feel that it can solve our emotional problems.

   (A) divergence..certainty about
   (B) confrontation..enigmas in
   (C) withdrawal..belief in
   (D) defense..weaknesses in
   (E) failure..rigor in

5. The struggle of the generations is one of the obvious constants of human affairs; therefore, it may be presumptuous to suggest that the rivalry between young and old in Western society during the current decade is —— critical.

   (A) perennially (B) disturbingly
   (C) uniquely (D) archetypally
   (E) captiously

6. Rhetoric often seems to —— over reason in a heated debate, with both sides —— in hyperbole.

   (A) cloud..subsiding
   (B) prevail..yielding
   (C) triumph..engaging
   (D) reverberate..clamoring
   (E) trample..tangling

7. Melodramas, which presented stark oppositions between innocence and criminality, virtue and corruption, good and evil, were popular precisely because they offered the audience a world —— of ——.

   (A) bereft..theatricality
   (B) composed..adversity
   (C) full..circumstantiality
   (D) deprived..polarity
   (E) devoid..neutrality

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. NURTURE:CHILD ::
(A) cultivate:crop (B) quench:fire
(C) marvel:infant (D) secure:possession
(E) delimit:obligation

9. SAW:CARPENTER :: (A) brush:painter
(B) typewriter:author (C) trowel:bricklayer
(D) wagon:farmer (E) scissors:tailor

10. EPITAPH:TOMBSTONE ::
(A) pedestal:statue (B) prologue:play
(C) melody:song (D) salutation:letter
(E) motto:shield

11. SIMPER:SMILE :: (A) babble:talk
(B) thought:blank (C) look:espy
(D) leer:ogle (E) wink:eye

12. EGG:CHICKEN :: (A) pearl:oyster
(B) roe:salmon (C) shell:clam
(D) skin:shark (E) tusk:walrus

13. GLIMMER:DAZZLE ::
(A) delineate:disclaim (B) recede:abandon
(C) recite:harangue (D) muse:reflect
(E) murmur:resound

14. RESCIND:LAW ::
(A) postpone:performance
(B) withdraw:candidacy
(C) default:debt
(D) demote:hierarchy
(E) retire:position

15. ENTANGLE:INVOLVE :: (A) caution:fear
(B) compel:force (C) grill:question
(D) replicate:copy (E) waver:adhere

16. ALCHEMY:SCIENCE ::
(A) sideshow:carnival (B) forgery:imitation
(C) burlesque:comedy (D) ploy:tactic
(E) nostrum:remedy

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

A mysterious phenomenon is the ability of over-water migrants to travel on course. Birds, bees, and other species can keep track of time without any sensory cues from the outside world, and such "biological clocks" clearly contribute to their "compass sense." For example, they can use the position of the Sun or stars, along with the time of day, to find north. But compass sense alone cannot explain how birds navigate the ocean: after a flock traveling east is blown far south by a storm, it will assume the proper northeasterly course to compensate. Perhaps, some scientists thought, migrants determine their geographic position on Earth by celestial navigation, almost as human navigators use stars and planets, but this would demand of the animals a fantastic map sense. Researchers now know that some species have a magnetic sense, which might allow migrants to determine their geographic location by detecting variations in the strength of the Earth's magnetic field.

17. The main idea of the passage is that
    (A) migration over land requires a simpler explanation than migration over water does
    (B) the means by which animals migrate over water are complex and only partly understood
    (C) the ability of migrant animals to keep track of time is related to their magnetic sense
    (D) knowledge of geographic location is essential to migrants with little or no compass sense
    (E) explanations of how animals migrate tend to replace, rather than build on, one another

18. It can be inferred from the passage that if the flock of birds described in lines 8-12 were navigating by compass sense alone, they would, after the storm, fly
    (A) east (B) north (C) northwest (D) south (E) southeast

19. In maintaining that migrating animals would need "a fantastic map sense" (line 17) to determine their geographic position by celestial navigation, the author intends to express
    (A) admiration for the ability of the migrants
    (B) skepticism about celestial navigation as an explanation
    (C) certainty that the phenomenon of migration will remain mysterious
    (D) interest in a new method of accounting for over-water migration
    (E) surprise that animals apparently navigate in much the same way that human beings do

20. Of the following descriptions of migrating animals, which most strongly suggests that the animals are depending on magnetic cues to orient themselves?
    (A) Pigeons can properly readjust their course even when flying long distances through exceedingly dense fogs.
    (B) Bison are able to reach their destination by passing through a landscape that has been partially altered by a recent fire.
    (C) Elephants are able to find grounds that some members of the herd have never seen before.
    (D) Swallows are able to return to a given spot at the same time every year.
    (E) Monarch butterflies coming from different parts of North America are able to arrive at the same location each winter.

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Roger Rosenblatt's book *Black Fiction*, in attempting to apply literary rather than sociopolitical criteria to its subject, successfully alters the approach taken by most previous studies. As Rosenblatt notes, criticism of Black writing has often served as a pretext for expounding on Black history. Addison Gayle's recent work, for example, judges the value of Black fiction by overtly political standards, rating each work according to the notions of Black identity which it propounds.

Although fiction assuredly springs from political circumstances, its authors react to those circumstances in ways other than ideological, and talking about novels and stories primarily as instruments of ideology circumvents much of the fictional enterprise. Rosenblatt's literary analysis discloses affinities and connections among works of Black fiction which solely political studies have overlooked or ignored.

Writing acceptable criticism of Black fiction, however, presupposes giving satisfactory answers to a number of questions. First of all, is there a sufficient reason, other than the racial identity of the authors, to group together works by Black authors? Second, how does Black fiction make itself distinct from other modern fiction with which it is largely contemporaneous? Rosenblatt shows that Black fiction constitutes a distinct body of writing that has an identifiable, coherent literary tradition. Looking at novels written by Blacks over the last eighty years, he discovers recurring concerns and designs independent of chronology. These structures are thematic, and they spring, not surprisingly, from the central fact that the Black characters in these novels exist in a predominantly White culture, whether they try to conform to that culture or rebel against it.

Black Fiction does leave some aesthetic questions open. Rosenblatt's thematic analysis permits considerable objectivity; he even explicitly states that it is not his intention to judge the merit of the various works—yet his reluctance seems misplaced, especially since an attempt to appraise might have led to interesting results. For instance, some of the novels appear to be structurally diffuse. Is this a defect, or are the authors working out of, or trying to forge, a different kind of aesthetic? In addition, the style of some Black novels, like Jean Toomer's *Cane*, verges on expressionism or surrealism; does this technique provide a counterpoint to the prevalent theme that portrays the fate against which Black heroes are pitted, a theme usually conveyed by more naturalistic modes of expression?

In spite of such omissions, what Rosenblatt does include in his discussion makes for an astute and worthwhile study. *Black Fiction* surveys a wide variety of novels, bringing to our attention in the process some fascinating and little-known works like James Weldon Johnson's *Autobiography of an Ex-Colored Man*. Its argument is tightly constructed, and its forthright, lucid style exemplifies levelheaded and penetrating criticism.

21. The author of the passage objects to criticism of Black fiction like that by Addison Gayle because it
    (A) emphasizes purely literary aspects of such fiction
    (B) misinterprets the ideological content of such fiction
    (C) misunderstands the notions of Black identity contained in such fiction
    (D) substitutes political for literary criteria in evaluating such fiction
    (E) ignores the interplay between Black history and Black identity displayed in such fiction

22. The author of the passage is primarily concerned with
    (A) evaluating the soundness of a work of criticism
    (B) comparing various critical approaches to a subject
    (C) discussing the limitations of a particular kind of criticism
    (D) summarizing the major points made in a work of criticism
    (E) explaining the theoretical background of a certain kind of criticism

GO ON TO THE NEXT PAGE.

23. The author of the passage believes that *Black Fiction* would have been improved had Rosenblatt

(A) evaluated more carefully the ideological and historical aspects of Black fiction
(B) attempted to be more objective in his approach to novels and stories by Black authors
(C) explored in greater detail the recurrent thematic concerns of Black fiction throughout its history
(D) established a basis for placing Black fiction within its own unique literary tradition
(E) assessed the relative literary merit of the novels he analyzes thematically

24. The author's discussion of *Black Fiction* can be best described as

(A) pedantic and contentious
(B) critical but admiring
(C) ironic and deprecating
(D) argumentative but unfocused
(E) stilted and insincere

25. It can be inferred that the author of the passage would be LEAST likely to approve of which of the following?

(A) An analysis of the influence of political events on the personal ideology of Black writers
(B) A critical study that applies sociopolitical criteria to autobiographies by Black authors
(C) A literary study of Black poetry that appraises the merits of poems according to the political acceptability of their themes
(D) An examination of the growth of a distinct Black literary tradition within the context of Black history
(E) A literary study that attempts to isolate aesthetic qualities unique to Black fiction

26. The author of the passage uses all of the following in the discussion of Rosenblatt's book EXCEPT

(A) rhetorical questions
(B) specific examples
(C) comparison and contrast
(D) definition of terms
(E) personal opinion

27. The author of the passage refers to James Weldon Johnson's *Autobiography of an Ex-Colored Man* most probably in order to

(A) point out affinities between Rosenblatt's method of thematic analysis and earlier criticism
(B) clarify the point about expressionistic style made earlier in the passage
(C) qualify the assessment of Rosenblatt's book made in the first paragraph of the passage
(D) illustrate the affinities among Black novels disclosed by Rosenblatt's literary analysis
(E) give a specific example of one of the accomplishments of Rosenblatt's work

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. INFINITY:
(A) bounded space
(B) physical repulsion
(C) inadequate measurement
(D) weak charge
(E) small miscalculation

29. TRUCE: (A) resumed fighting
(B) false pretenses (C) genuine grievances
(D) nonmilitary service (E) tactical error

30. DAMPED: (A) phonetic (B) flexible
(C) amplified (D) concentrated
(E) variable

31. TURBULENT: (A) obverse (B) extensive
(C) serial (D) pacific (E) deflated

32. LUCID: (A) vague (B) cynical
(C) tedious (D) unreliable (E) improper

33. EBULLIENCE: (A) pomposity (B) sterility
(C) awkwardness (D) careful organization
(E) calm restraint

34. CAPRICIOUS: (A) deductive
(B) meaningful (C) steadfast (D) limited
(E) straightforward

35. IMPASSIVE: (A) overwrought
(B) long-winded (C) pompous
(D) energetic (E) adept

36. TORTUOUS: (A) gently inclined
(B) logically accurate (C) surmountable
(D) sparse (E) direct

37. TOUT: (A) placate (B) misrepresent
(C) withhold consent (D) cast aspersions on
(E) deny the relevance of

38. PROMPT: (A) betray (B) check
(C) sway (D) complicate (E) defer

SECTION 2

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

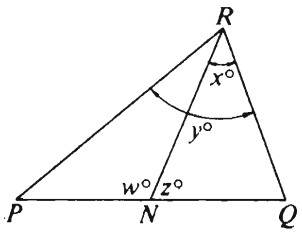
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

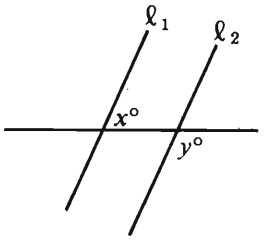


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	$\frac{1}{5} - \frac{1}{6}$	$\frac{1}{30}$



ℓ_1 is parallel to ℓ_2.

2.	$x + y$	180
3.	11 percent of 20	10 percent of 21

$x^3 = -125$

4.	$5x$	x^2

A rectangular tabletop with length 5 feet and width $3\frac{1}{2}$ feet has an area of x square feet and a perimeter of y feet.

5.	x	y

	Column A	Column B
6.	The least integer x such that $5(10^x) > 25{,}643$	5

In a certain two-digit number, the units' digit is twice the tens' digit.

7.	The tens' digit	5
8.	The perimeter of a square with a side of length 2	The perimeter of a rectangle with a side of length 3

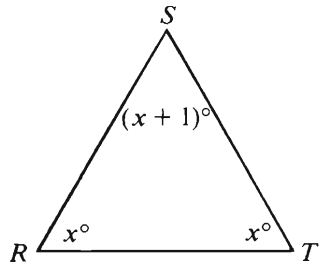
If the sum of the measures of two angles is 180°, each angle is a supplement of the other, whereas, if the sum of their measures is 90°, each is a complement of the other.

9.	The measure of an angle with a supplement that measures 130°	The measure of an angle with a complement that measures 40°

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	$y = 5x^4 - 3x^5 + 8x^6$	
10.	The value of y if $x = -2$	The value of y if $x = 2$
	$0 < x < 2$	
11.	x	x^2
	The product of two integers is 6.	
12.	The sum of the two integers	3



13.	RS	RT

	Column A	Column B
	After 2 females leave a party, there are twice as many males as females. Then 9 males leave and there are twice as many females as males.	
14.	The total number of people left at the party after the 9 males leave	8
	In a certain store there are at least 100 pears and the ratio of the number of plums to the number of pears is 4 to 5.	
15.	The number of plums in the store	100

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Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. If $2x - 5 = 25$, then $x =$

(A) 30 (B) 20 (C) 15 (D) $12\frac{1}{2}$ (E) 5

17. The temperature in a certain area increased 7 degrees, then decreased 10 degrees, and then increased 5 degrees. If the temperature before the changes was x degrees, which of the following was the temperature, in degrees, after the changes?

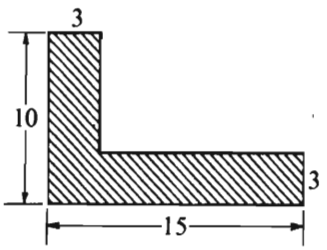
(A) $x - 8$ (B) $x - 3$ (C) $x + 2$
(D) $x + 8$ (E) $x + 10$

18. A consumer insulates a house with material bought at 20 percent off the list price of \$370. If the consumer also receives a rebate of \$25 from the manufacturer of the material, how much does the material cost the consumer?

(A) \$238
(B) \$240
(C) \$263
(D) \$271
(E) \$325

19. If $2x + 1 = 9$ and $y = x^2$, then $y =$

(A) 25 (B) 16 (C) 8 (D) 4 (E) 2



20. In the figure above, any two intersecting line segments are perpendicular. What is the area of the shaded region?

(A) $37\frac{1}{2}$ (B) 50 (C) 57 (D) 66 (E) 75

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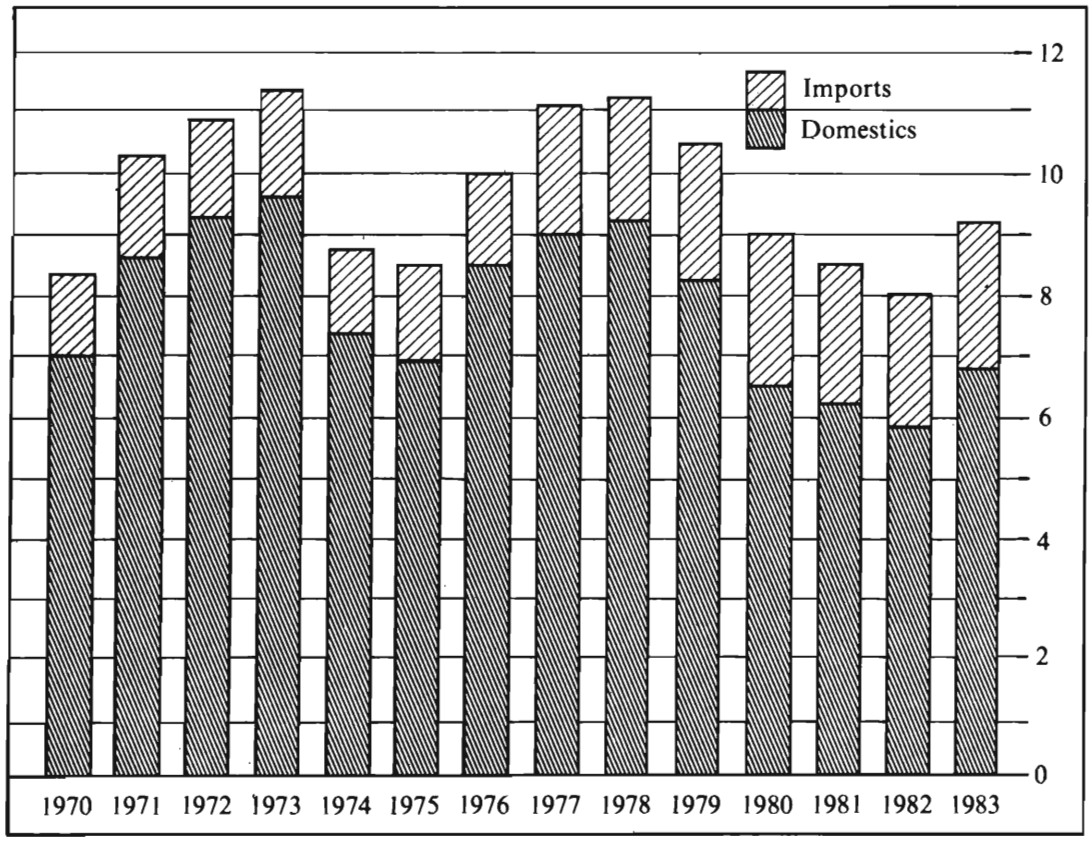
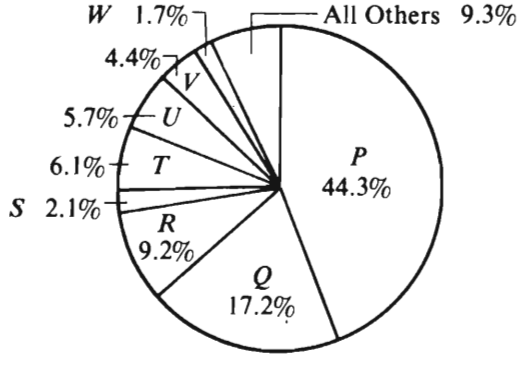
Questions 21-25 refer to the following graphs.

RETAIL SALES OF NEW CARS IN THE UNITED STATES, 1970-1983
(in millions)

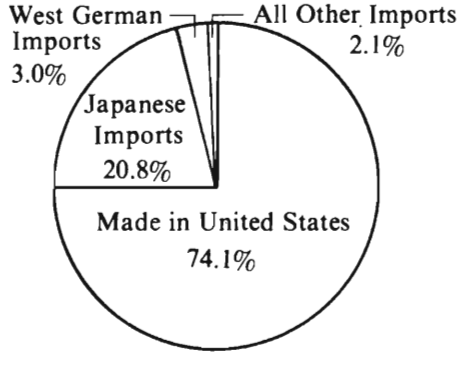


HOW THE 1983 RETAIL SALES OF NEW CARS IN THE UNITED STATES WERE DIVIDED
(100% = 9.16 million)

By Manufacturer*



By Country



*Domestic: *P*, *Q*, *R*, and *S*
Japanese: *T*, *U*, and *V*
West German: *W*

Note: Drawn to scale.

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21. What was the last year prior to 1983 in which retail sales of new cars in the United States exceeded the retail sales of new cars in 1983 ?

(A) 1979 (B) 1978 (C) 1977
(D) 1976 (E) 1973

22. For the year shown in which the total number of new cars sold was less than the number of new domestic cars sold the previous year, approximately how many fewer new domestic cars were sold than in the previous year?

(A) 500,000
(B) 1,000,000
(C) 1,600,000
(D) 2,200,000
(E) 3,000,000

23. Approximately what percent of all the new cars sold retail in the United States in 1983 were imported from Japanese manufacturers other than companies *T*, *U*, and *V*?

(A) 2.9%
(B) 4.6%
(C) 6.9%
(D) 9.3%
(E) 11.5%

24. Approximately what percent of the new domestic cars sold retail in the United States in 1983 were manufactured by Company *Q*?

(A) 10%
(B) 12%
(C) 15%
(D) 17%
(E) 23%

25. Approximately how many of the new cars sold retail in the United States in 1983 were imported from West German manufacturers other than Company *W*?

(A) 32,000
(B) 119,000
(C) 156,000
(D) 192,000
(E) 275,000

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26. If the area of square S is 20 square centimeters, which of the following is closest to the length, in centimeters, of one side of S?

(A) 3.5 (B) 4.0 (C) 4.5
(D) 5.0 (E) 5.5

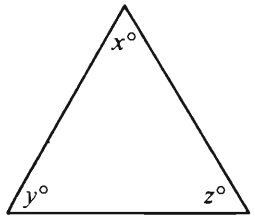
27. If N is the average (arithmetic mean) of five numbers, which of the following must be true?

I. At least one of the five numbers is greater than or equal to N.
II. At least one of the five numbers is less than or equal to N.
III. At least two of the five numbers are greater than or equal to N.

(A) I only (B) II only (C) I and II only
(D) I and III only (E) I, II, and III

28. $(2uv)^2 + (u^2 - v^2)^2 =$

(A) $2uv$ (B) $u^2 - v^2$ (C) $u^2 + v^2$
(D) $(2uv)^2 + (u^2 + v^2)^2$ (E) $(u^2 + v^2)^2$



29. In the figure above, if x, y, and z are integers such that $x < y < z$, then the least and the greatest possible values of $x + z$ are

(A) 59 and 91
(B) 59 and 135
(C) 91 and 178
(D) 120 and 135
(E) 120 and 178

30. What is the least prime number greater than 83?

(A) 85 (B) 87 (C) 88 (D) 89 (E) 91

SECTION 3

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-4

Seven meetings—J, K, L, M, N, O, and P—are to be scheduled, one on each day of a week that begins on Sunday.

Meeting J must take place on Sunday.

Meeting K must take place after both meeting L and meeting M.

Meetings N, O, and P must take place on three consecutive days, not necessarily in that order.

1. Which is the latest day of the week on which meeting L can take place?

   (A) Tuesday
   (B) Wednesday
   (C) Thursday
   (D) Friday
   (E) Saturday

2. Which of the following must be true about the order of meetings?

   (A) L takes place after J.
   (B) L takes place after O.
   (C) N takes place after O.
   (D) N takes place after P.
   (E) O takes place after P.

3. If meeting O is on Saturday, then meeting K must take place on

   (A) Monday
   (B) Tuesday
   (C) Wednesday
   (D) Thursday
   (E) Friday

4. Which of the following represents a possible ordering of meetings on three consecutive days?

   (A) JMK
   (B) KLO
   (C) MNJ
   (D) OJN
   (E) POM

5. As a practical matter, the copper available for industrial use should not be thought of as limited by the quantity of copper deposits, known or unknown. The transmutation of one chemical element into another is a modern reality, through the methods of nuclear physics. Therefore, the quantity of a natural resource such as copper cannot be calculated even in principle, because copper can be made from other metals.

   Which of the following, if true, is the strongest argument against the argument above?

   (A) Although it is possible that additional deposits of copper will be found, geological considerations strongly indicate that they will not amount to more than a fifty-year supply.
   (B) The production of copper from other metals in industrial quantities would be prohibitively expensive in energy and materials.
   (C) Synthetic materials have been discovered that can serve as practical substitutes for copper in most of its uses.
   (D) It will be impractical, in the foreseeable future, to mine any deposits of metal that may exist on the Moon or on other planets.
   (E) Methods for estimating the amount of copper available in currently known deposits have become very sophisticated and have proved quite accurate.

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6. The world's annual food production slightly exceeds the amount of food required to provide a minimally adequate diet for the world's population. To predict that insufficient food production will cause a hunger crisis in the future is nonsense. Any hunger crisis will result from a distribution problem rather than a production problem.

   The statement above assumes which of the following?

   (A) The world's food requirements are greater than they will be in the future.
   (B) A shortfall in the world's food production can be prevented by a better distribution system.
   (C) The world's food production will continue to be sufficient to meet or exceed needs.
   (D) The distribution of the world's existing food supply will be improved in the future.
   (E) The world hunger crisis will not exist in the future.

7. Psychological maladjustment in children is caused by the stress of the birthing process as is proved by the discovery of a positive relationship between the duration of the mother's labor and the amount of time the child spent crying in the first month of life.

   Which of the following, if true, LEAST damages the author's assertion?

   (A) There is no relationship between the amount of time spent crying and psychological maladjustment.
   (B) Behavior indicative of psychological maladjustment does not appear until the third month of a child's life.
   (C) From the infant's point of view, a hurried labor is more stressful than a gradual, slow delivery.
   (D) The estimates of the duration of labor were based on obstetricians' estimates of the time of the onset of labor.
   (E) The infants who have experienced the greatest stress during birth are often too weak to cry for extended periods of time.

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Questions 8-13

The directors of a museum are mounting an exhibition of paintings in a space temporarily partitioned into exactly seven rooms—R, S, T, U, X, Y, and Z. Visitors reach room R by an elevator, and they can enter and leave the exhibition only through room R. Once inside, visitors are free to move as they choose from room to room. The following list includes all of the doorways that connect the seven rooms:

There is a doorway between R and S, a doorway between R and T, and a doorway between R and X.
There is a doorway between S and T.
There is a doorway between X and U and a doorway between X and Y.
There is a doorway between Y and Z.

8. Which of the following rooms CANNOT be the third room of the exhibition that any visitor enters?

(A) S (B) T (C) U (D) Y (E) Z

9. Which of the following is a room that a visitor must enter before entering room U ?

(A) S (B) T (C) X (D) Y (E) Z

10. If one of the doorways between two exhibition rooms is to be closed off, and yet all rooms are to remain accessible to visitors, the closed-off doorway can be a doorway allowing passage to which of the following rooms?

(A) R (B) U (C) X (D) Y (E) Z

11. If a visitor to the exhibition enters no room more often than necessary to visit all of the rooms and then leaves the exhibition, which of the following rooms must the visitor enter exactly twice?

(A) R (B) S (C) T (D) X (E) Y

12. After stopping to rest in Z, a visitor goes from Z to T, passing through no more rooms than necessary. On reaching T, the visitor will have passed through a total of how many rooms (counting neither Z nor T) since the rest stop?

(A) 2 (B) 3 (C) 4 (D) 5 (E) 6

13. Which of the following proposed new doorways would make it possible for a visitor to begin at R and visit all the rest of the rooms, arriving last at Z, without having entered any of the rooms in the exhibition twice?

(A) R-U
(B) S-Z
(C) T-U
(D) U-Y
(E) U-Z

GO ON TO THE NEXT PAGE.

Questions 14-18

Each perfume made by a manufacturer is a mixture of two or more essences selected from a stock of exactly five different essences labeled F, G, H, J, and K. The manufacturer has learned that a formula for a perfume is acceptable if and only if it does not violate any of the rules listed below.

If the perfume contains F, it must also contain H, and there must be twice as much H as F.
If the perfume contains G, it must also contain J, and the amount of J must equal the amount of G.
H cannot be used in combination with J.
J cannot be used in combination with K.
If the perfume contains K, the amount of K must be greater than the total amount of the other essence or essences used.

14. Which of the following is an acceptable formula for a perfume?

(A) One part F, one part K
(B) Two parts G, two parts F
(C) Three parts H, three parts F
(D) Four parts J, four parts G
(E) Five parts K, five parts G

15. The addition of more H could make which of the following formulas for perfumes acceptable?

(A) One part F, one part H, five parts K
(B) Two parts F, two parts H, two parts K
(C) One part G, one part H, one part K
(D) Two parts G, one part H, four parts K
(E) Two parts H, one part J, three parts K

16. Which of the following could be added to an unacceptable perfume consisting of two parts H and one part K to make it acceptable?

(A) One part F
(B) One part G
(C) Two parts H
(D) One part J
(E) Two parts K

17. Each of the following is a pair of essences that can be used together in an acceptable perfume consisting of two or more essences EXCEPT

(A) F and G
(B) F and H
(C) F and K
(D) G and J
(E) K and H

18. Which of the following formulas for perfumes could be made acceptable by removing some or all of one essence?

(A) One part F, one part G, one part H, four parts K
(B) One part F, two parts H, one part J, four parts K
(C) One part F, one part G, one part J, one part K
(D) Two parts F, two parts H, one part J, two parts K
(E) Two parts G, one part H, two parts J, three parts K

GO ON TO THE NEXT PAGE.

Questions 19-22

Eight adjacent offices completely enclose a circular central courtyard. The offices are numbered consecutively, beginning at one of the offices with 1 and proceeding clockwise to 8. Eight junior executives—J, K, L, M, N, O, P, and R—are to occupy the offices, one to an office. The assignment of offices is subject to the following restrictions:

J is allowed first choice of any of the offices.
K and P must be assigned to adjacent offices.
L and P must be assigned to adjacent offices.
M and O must be assigned to adjacent offices.
M and N cannot be assigned to adjacent offices.
O is assigned to office 2 unless J chooses it; in that case, O will be assigned to office 3.
K is assigned to office 7 unless J chooses it; in that case, K will be assigned to office 5.

19. Which of the following is an assignment of executives to offices, beginning with office 1 and proceeding consecutively to office 8, that conforms to the restrictions above?

(A) J, O, M, R, L, P, K, N
(B) J, R, O, M, L, P, K, N
(C) M, O, N, K, P, L, R, J
(D) M, O, R, J, L, K, P, N
(E) N, J, O, M, K, P, L, R

20. If J chooses office 8, which of the following must be true?

(A) L is assigned to office 5.
(B) M is assigned to office 1.
(C) M is assigned to office 3.
(D) N is assigned to office 1.
(E) R is assigned to office 1.

21. P could be assigned to which of the following offices?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

22. If N is assigned to office 5, which of the following can be true?

(A) L is assigned to office 3.
(B) M is assigned to office 4.
(C) O is assigned to office 3.
(D) P is assigned to office 1.
(E) R is assigned to office 6.

23. Found in caves with the bones of australopithecines, which are thought by some to be ancient ancestors of the human species, were great collections of animal bones. From the frequencies of types of bones, it can be seen that many bones represented only parts of animals that must have died elsewhere. The australopithecines thus must have been mighty hunters, to have brought home so much meat.

Which of the following, if true, most seriously weakens the conclusion drawn above?

(A) The australopithecines sometimes moved from cave to cave for shelter and did not remain in one cave for a lifetime.
(B) The australopithecine bones found in the caves were those of adult males, adult females, and juveniles.
(C) Evidence of the use of fire was absent from the caves in which the collections of bones were found.
(D) Marks on the bones, including the bones of the australopithecines, are consistent with teeth marks of large catlike animals of the period.
(E) The bones in the cave did not include bones of an elephantlike animal that existed in the area at the time of the australopithecines.

GO ON TO THE NEXT PAGE.

24. During the Second World War, fighter pilots watched for enemies in the sky by direct visual perception. The pilots had to turn their heads frequently in order to look to their rear, and so calisthenics to develop neck muscles were part of their training. Today, with electronic instruments, pilots never need to look to the rear. Their ability to detect slight changes on electronic dials and gauges is more significant than their keenness of long-distance vision or their developed musculature.

The information above best supports which of the following conclusions?

(A) The reliance on increasingly sophisticated electronic instruments in air combat situations will soon make human pilots superfluous.
(B) Visual acuity is of little help in air combat today because of the terrific speeds at which modern aircraft approach each other.
(C) Fitness with regard to military service must always be defined in terms of the demands combat situations place on combatants.
(D) The performance of pilots will necessarily decline if the strenuous physical conditioning programs employed in the past are not continued.
(E) Revisions of military training programs at frequent intervals can guarantee adaptability to the demands of future combat situations.

25. Some United States psychologists have concluded that one specific set of parental behaviors toward children always signifies acceptance and a second set always signifies rejection, for there is remarkable agreement among investigators about the maternal behaviors designated as indicative of these parental attitudes.

The conclusion of the psychologists mentioned above logically depends on the assumption that

(A) most maternal behaviors have been interpreted as conveying either acceptance or rejection
(B) the maternal behaviors indicating acceptance or rejection are exhibited by fathers as well
(C) the behaviors of fathers toward children have been studied as carefully as have the behaviors of mothers
(D) acceptance and rejection are the easiest to recognize of all parental behaviors
(E) parental attitudes are best conveyed through behaviors that the parents have consciously agreed on

SECTION 4

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. In the current research program, new varieties of apple trees are evaluated under different agricultural ------- for tree size, bloom density, fruit size, ------- to various soils, and resistance to pests and disease.

   (A) circumstances..proximity
   (B) regulations..conformity
   (C) conditions..adaptability
   (D) auspices..susceptibility
   (E) configurations..propensity

2. At first, I found her gravity rather intimidating; but, as I saw more of her, I found that ------- was very near the surface.

   (A) seriousness (B) confidence
   (C) laughter (D) poise (E) determination

3. Even though in today's Soviet Union the ------ the Muslim clergy have been accorded power and privileges, the Muslim laity and the rank-and-file clergy still have little ------- to practice their religion.

   (A) practitioners among..opportunity
   (B) dissidents within..obligation
   (C) adversaries of..inclination
   (D) leaders of..latitude
   (E) traditionalists among..incentive

4. The proponents of recombinant DNA research have decided to ------- federal regulation of their work; they hope that by making this compromise they can forestall proposed state and local controls that might be even stiffer.

   (A) protest (B) institute (C) deny
   (D) encourage (E) disregard

5. It is to the novelist's credit that all of the episodes in her novel are presented realistically, without any ------- or playful supernatural tricks.

   (A) elucidation (B) discrimination
   (C) artlessness (D) authenticity
   (E) whimsy

6. Our new tools of systems analysis, powerful though they may be, lead to ------ theories, especially, and predictably, in economics and political science, where productive approaches have long been highly ------.

   (A) pragmatic..speculative
   (B) inelegant..efficacious
   (C) explanatory..intuitional
   (D) wrongheaded..convergent
   (E) simplistic..elusive

7. Nineteenth-century scholars, by examining earlier geometric Greek art, found that classical Greek art was not a magical ------ or a brilliant ------ blending Egyptian and Assyrian art, but was independently evolved by Greeks in Greece.

   (A) stratagem..appropriation
   (B) exemplar..synthesis
   (C) conversion..annexation
   (D) paradigm..construct
   (E) apparition..amalgam

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. ANXIOUS:REASSURANCE ::
   (A) resentful:gratitude
   (B) perplexed:clarification
   (C) inured:imagination
   (D) vociferous:suppression
   (E) abstemious:indulgence

9. STANZA:POEM :: (A) pirouette:ballet
   (B) rhyme:verse (C) duet:chorus
   (D) act:opera (E) mimicry:pantomime

10. COIN:DENOMINATION :: (A) book:title
    (B) officer:rank (C) house:architecture
    (D) doctor:profession (E) tree:wood

11. EMBELLISH:AUSTERE ::
    (A) condense:illusive (B) alter:remarkable
    (C) train:clumsy (D) adulterate:pure
    (E) refine:unique

* 12. PORTFOLIO:SECURITIES ::
    (A) assessment:taxes
    (B) computer:programs
    (C) insurance:risks
    (D) résumé:careers
    (E) dossier:reports

13. EXHORT:SUGGEST :: (A) crave:accept
    (B) goad:direct (C) instruct:teach
    (D) tamper:adjust (E) conspire:plan

14. CLAY:PORCELAIN :: (A) glass:china
    (B) fire:ash (C) slag:iron
    (D) flax:linen (E) sand:sediment

15. SERMON:HOMILETICS ::
    (A) argument:logic (B) baseball:athletics
    (C) word:language (D) student:pedagogy
    (E) album:philately

16. MATRIX:NUMBERS :: (A) gas:molecules
    (B) volume:liquid (C) crystal:atoms
    (D) interaction:reagents (E) stratum:layer

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

The molecules of carbon dioxide in the Earth's atmosphere affect the heat balance of the Earth by acting as a one-way screen. Although these molecules allow radiation at visible wavelengths, where most of the energy of sunlight is concentrated, to pass through, they absorb some of the longer-wavelength, infrared emissions radiated from the Earth's surface, radiation that would otherwise be transmitted back into space. For the Earth to maintain a constant average temperature, such emissions from the planet must balance incoming solar radiation. If there were no carbon dioxide in the atmosphere, heat would escape from the Earth much more easily. The surface temperature would be so much lower that the oceans might be a solid mass of ice.

Today, however, the potential problem is too much carbon dioxide. The burning of fossil fuels and the clearing of forests have increased atmospheric carbon dioxide by about 15 percent in the last hundred years, and we continue to add carbon dioxide to the atmosphere. Could the increase in carbon dioxide cause a global rise in average temperature, and could such a rise have serious consequences for human society? Mathematical models that allow us to calculate the rise in temperature as a function of the increase indicate that the answer is probably yes.

Under present conditions a temperature of $-18°C$ can be observed at an altitude of 5 to 6 kilometers above the Earth. Below this altitude (called the radiating level), the temperature increases by about $6°C$ per kilometer approaching the Earth's surface, where the average temperature is about $15°C$. An increase in the amount of carbon dioxide means that there are more molecules of carbon dioxide to absorb infrared radiation. As the capacity of the atmosphere to absorb infrared radiation increases, the radiating level and the temperature of the surface must rise.

One mathematical model predicts that doubling the atmospheric carbon dioxide would raise the global mean surface temperature by $2.5°C$. This model assumes that the atmosphere's relative humidity remains constant and the temperature decreases with altitude at a rate of $6.5°C$ per kilometer. The assumption of constant relative humidity is important, because water vapor in the atmosphere is another efficient absorber of radiation at infrared wavelengths. Because warm air can hold more moisture than cool air, the relative humidity will be constant only if the amount of water vapor in the atmosphere increases as the temperature rises. Therefore, more infrared radiation would be absorbed and reradiated back to the Earth's surface. The resultant warming at the surface could be expected to melt snow and ice, reducing the Earth's reflectivity. More solar radiation would then be absorbed, leading to a further increase in temperature.

17. The primary purpose of the passage is to
    (A) warn of the dangers of continued burning of fossil fuels
    (B) discuss the significance of increasing the amount of carbon dioxide in the atmosphere
    (C) explain how a constant temperature is maintained on the Earth's surface
    (D) describe the ways in which various atmospheric and climatic conditions contribute to the Earth's weather
    (E) demonstrate the usefulness of mathematical models in predicting long-range climatic change

18. According to the passage, the greatest part of the solar energy that reaches the Earth is
    (A) concentrated in the infrared spectrum
    (B) concentrated at visible wavelengths
    (C) absorbed by carbon dioxide molecules
    (D) absorbed by atmospheric water vapor
    (E) reflected back to space by snow and ice

GO ON TO THE NEXT PAGE.

19. According to the passage, atmospheric carbon dioxide performs all of the following functions EXCEPT

(A) absorbing radiation at visible wavelengths
(B) absorbing infrared radiation
(C) absorbing outgoing radiation from the Earth
(D) helping to retain heat near the Earth's surface
(E) helping to maintain a constant average temperature on the Earth's surface

20. Which of the following best describes the author's attitude toward the increasing amount of carbon dioxide in the atmosphere and its consequences?

(A) Incredulous
(B) Completely detached
(C) Interested but skeptical
(D) Angry yet resigned
(E) Objective yet concerned

21. It can be concluded from information contained in the passage that the average temperature at an altitude of 1 kilometer above the Earth is about

(A) 15°C
(B) 9°C
(C) 2.5°C
(D) −12°C
(E) −18°C

22. It can be inferred from the passage that the construction of the mathematical model mentioned in the passage involved the formulation of which of the following?

(A) An assumption that the amount of carbon dioxide added to the atmosphere would in reality steadily increase
(B) An assumption that human activities are the only agencies by which carbon dioxide is added to the atmosphere
(C) Assumptions about the social and political consequences of any curtailment of the use of fossil fuels
(D) Assumptions about the physical conditions that are likely to prevail during the period for which the model was made
(E) Assumptions about the differential behavior of carbon dioxide molecules at the various levels of temperature calculated in the model

23. According to the passage, which of the following is true of the last hundred years?

(A) Fossil fuels were burned for the first time.
(B) Greater amounts of land were cleared than at any time before.
(C) The average temperature at the Earth's surface has become 2°C cooler.
(D) The amount of carbon dioxide in the atmosphere has increased measurably.
(E) The amount of farmland worldwide has doubled.

GO ON TO THE NEXT PAGE.

Some modern anthropologists hold that biological evolution has shaped not only human morphology but also human behavior. The role those anthropologists ascribe to evolution is not of dictating the details of human behavior but one of imposing constraints—ways of feeling, thinking, and acting that "come naturally" in archetypal situations in any culture. Our "frailties"—emotions and motives such as rage, fear, greed, gluttony, joy, lust, love—may be a very mixed assortment, but they share at least one immediate quality: we are, as we say, "in the grip" of them. And thus they give us our sense of constraints.

Unhappily, some of those frailties—our need for ever-increasing security among them—are presently maladaptive. Yet beneath the overlay of cultural detail, they, too, are said to be biological in direction, and therefore as natural to us as are our appendixes. We would need to comprehend thoroughly their adaptive origins in order to understand how badly they guide us now. And we might then begin to resist their pressure.

24. The primary purpose of the passage is to present
    (A) a position on the foundations of human behavior and on what those foundations imply
    (B) a theory outlining the parallel development of human morphology and of human behavior
    (C) a diagnostic test for separating biologically determined behavior patterns from culture-specific detail
    (D) a practical method for resisting the pressures of biologically determined drives
    (E) an overview of those human emotions and motives that impose constraints on human behavior

25. The author implies that control to any extent over the "frailties" that constrain our behavior is thought to presuppose
    (A) that those frailties are recognized as currently beneficial and adaptive
    (B) that there is little or no overlay of cultural detail that masks their true nature
    (C) that there are cultures in which those frailties do not "come naturally" and from which such control can be learned
    (D) a full understanding of why those frailties evolved and of how they function now
    (E) a thorough grasp of the principle that cultural detail in human behavior can differ arbitrarily from society to society

26. Which of the following most probably provides an appropriate analogy from human morphology for the "details" versus "constraints" distinction made in the passage in relation to human behavior?
    (A) The ability of most people to see all the colors of the visible spectrum as against most people's inability to name any but the primary colors
    (B) The ability of even the least fortunate people to show compassion as against people's inability to mask their feelings completely
    (C) The ability of some people to dive to great depths as against most people's inability to swim long distances
    (D) The psychological profile of those people who are able to delay gratification as against people's inability to control their lives completely
    (E) The greater lung capacity of mountain peoples that helps them live in oxygen-poor air as against people's inability to fly without special apparatus

27. It can be inferred that in his discussion of maladaptive frailties the author assumes that
    (A) evolution does not favor the emergence of adaptive characteristics over the emergence of maladaptive ones
    (B) any structure or behavior not positively adaptive is regarded as transitory in evolutionary theory
    (C) maladaptive characteristics, once fixed, make the emergence of other maladaptive characteristics more likely
    (D) the designation of a characteristic as being maladaptive must always remain highly tentative
    (E) changes in the total human environment can outpace evolutionary change

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. PRESS: (A) excel (B) desire
(C) act (D) require (E) withdraw

29. INNOCENCE: (A) punishment (B) verdict
(C) corrosion (D) guilt (E) conflict

30. ELABORATE: (A) criticize (B) simplify
(C) imbue (D) expel (E) confuse

31. PERSISTENCE: (A) inequality
(B) inconstancy (C) irrelevance
(D) incompetence (E) intemperance

32. SKEPTICISM: (A) plausibility
(B) audacity (C) reason (D) argument
(E) conviction

33. REACTANT:
(A) by-product (B) low-grade ore
(C) inert material (D) inorganic substance
(E) nonradioactive element

34. CODA: (A) prelude (B) crescendo
(C) solo (D) refrain (E) improvisation

35. HACKNEYED: (A) useful (B) admissible
(C) ornate (D) meticulous (E) original

36. MACERATE:
(A) harden by drying
(B) influence by lying
(C) cover by painting
(D) cure by medicating
(E) assess by observing

37. GLIB: (A) illiterate (B) inexplicit
(C) verbose (D) perfunctory (E) labored

38. IMPUGN: (A) revoke (B) discharge
(C) champion (D) console (E) restore

SECTION 5

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

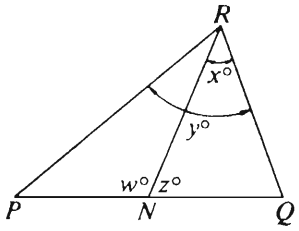
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

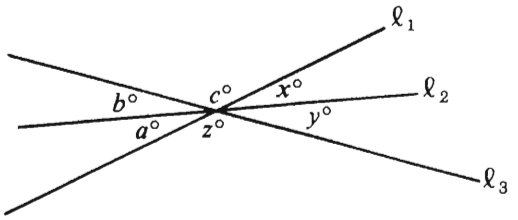


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

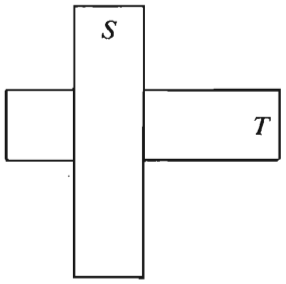
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	$x = 4$	
1.	x^4	16



2.	$b + c + x$	$a + z + y$
3.	The number of minutes it takes a car going 50 miles an hour to go 30 miles	The number of seconds it takes a car going 50 miles an hour to go 30 miles
	$x < 0$	
4.	$3 - x$	$x - 3$
5.	$\frac{0.08}{0.002}$	40

	Column A	Column B
6.	There was a total of n television sets in a certain store. After $\frac{1}{6}$ of these were removed from the store, 5 more television sets were delivered to the store, bringing the total number of television sets in the store to 65.	n 75
7.	$(112)^2 - (35)^2$	$(112 - 35)^2$



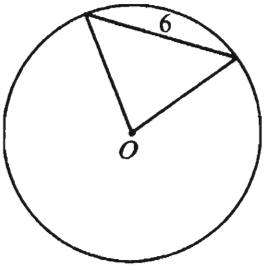
S and T are each rectangular tiles, 2 inches by 8 inches, and S overlaps T at right angles.

8.	The area of the portion of T shown that is not covered by S	12 square inches

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
9.	$(\sqrt{2}+\sqrt{2})^2$	$4+\sqrt{2}$
10.	The number of different prime factors of 48	The number of different prime factors of 72
11.	The average (arithmetic mean) of 22, 27, and 29	The median of 22, 27, and 29



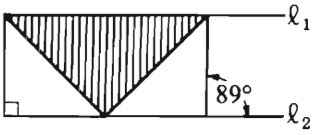
O is the center of the circle.

12.	The area of the circular region	36π

	Column A	Column B
	$g = \frac{4\pi^2 k}{a^2}$	
	a and k are positive.	
13.	a	$2\pi\sqrt{\frac{k}{g}}$

$\triangle RST$ lies in the xy-plane and points R and T have (x, y) coordinates (0, 0) and (5, 0), respectively. The area of $\triangle RST$ is 10.

14.	The x-coordinate of S	The y-coordinate of S



$\ell_1 \| \ell_2$

15.	The area of the shaded region	The sum of the areas of the two unshaded triangular regions

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. If $2 \times 16 = p \times 4 \times 8$, then $p =$

(A) 8 (B) 4 (C) 2 (D) 1 (E) $\frac{1}{2}$

17. A band is paid \$700 per concert. The leader receives 25 percent of this amount and the other 5 members share the rest equally. How much does each of the 5 other members receive?

(A) \$525
(B) \$175
(C) \$140
(D) \$112
(E) \$105

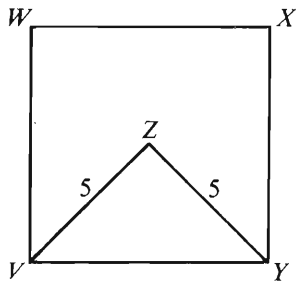
18. If $a + 3 = 4$, what is the value of $\frac{a+7}{a+3}$?

(A) $\frac{1}{2}$ (B) 2 (C) $\frac{7}{3}$ (D) 3 (E) 4

Select a number. Subtract 5 from the number. Multiply the difference by 2. Add 10 to the product.

19. For the steps above, what must be the final result?

(A) The number selected
(B) The number selected plus 5
(C) Twice the number selected
(D) Twice the number selected plus 5
(E) 0



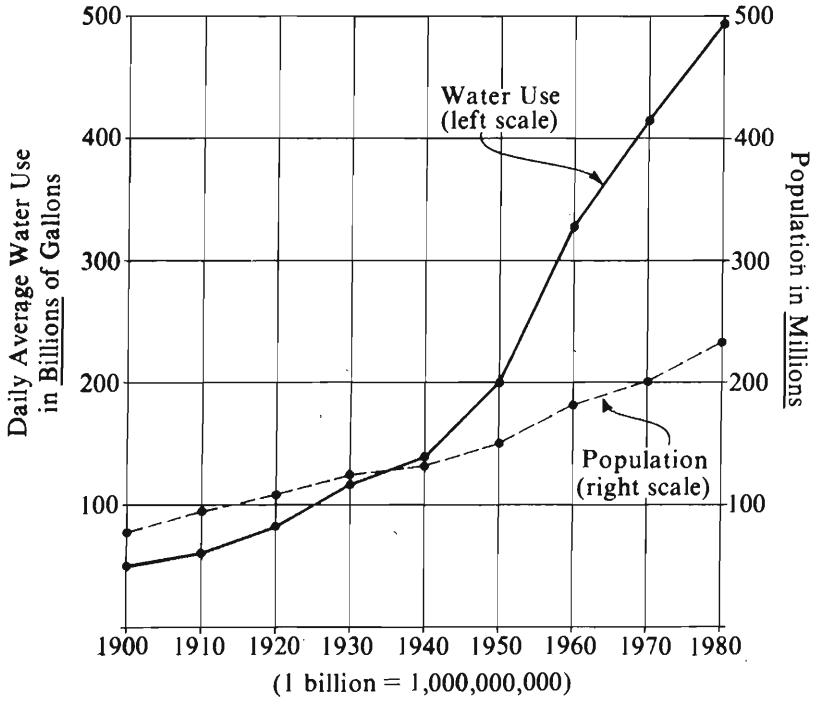
20. In the figure above, if the perimeter of $\triangle VZY$ is 17, what is the area of square region $VWXY$?

(A) 36 (B) 49 (C) 64
(D) 100 (E) 144

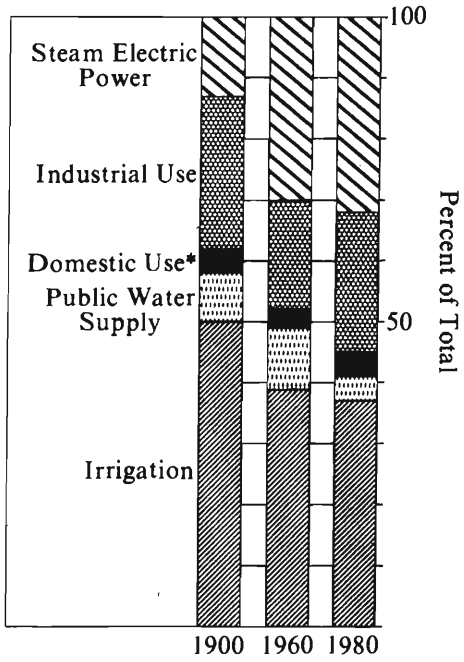
GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graphs.

WATER USE AND POPULATION IN COUNTRY *X*



DISTRIBUTION OF WATER USES



*Self-Supplied Farm and Nonfarm

Note: Drawn to scale.

GO ON TO THE NEXT PAGE.

21. For the year in which daily average water use was 200 billion gallons, approximately what was the population in millions?

(A) 150 (B) 175 (C) 200
(D) 330 (E) 420

22. The percent of water used for which of the following purposes increased from 1900 to 1960 ?

I. Steam electric power
II. Industrial use
III. Public water supply

(A) I only (B) II only (C) III only
(D) I and III only (E) I, II, and III

23. In which of the following years did the daily average number of gallons of water used equal the number of people in Country X ?

(A) 1900 (B) 1920 (C) 1940 (D) 1950
(E) None of the above

24. In 1970, if 5 percent of the water use was for domestic purposes, approximately what was the daily average number of gallons of water used per capita for domestic purposes?

(A) 105
(B) 50
(C) 20
(D) 10
(E) 5

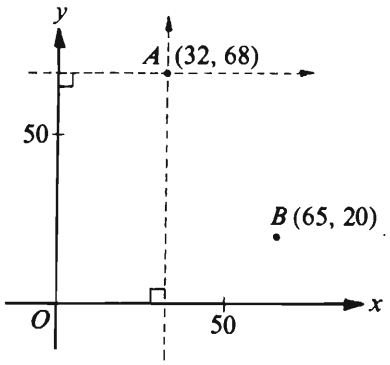
25. If in 1900 the water use in Country K was the same as that in Country X, but increased at the constant rate of 3 billion gallons every year, then the two countries would again have had the same water use in approximately what year?

(A) 1910 (B) 1920 (C) 1930
(D) 1940 (E) 1950

GO ON TO THE NEXT PAGE.

26. $\dfrac{4+\frac{2}{9}}{1+\frac{1}{6}} =$

(A) $\frac{133}{27}$ (B) $\frac{76}{21}$ (C) $\frac{44}{16}$ (D) $\frac{28}{11}$ (E) $\frac{5}{4}$



27. In the rectangular coordinate system above, the coordinates of points A and B are shown. If the dotted lines represent a second pair of coordinate axes with origin at A, and if the scale is the same on both pairs of axes, what are the coordinates of point B with respect to the second pair of axes?

(A) (−33, 88) (B) (33, 48) (C) (33, −48)
(D) (97, 88) (E) (97, −88)

28. If the sum of two numbers is known, which of the following is NOT sufficient to determine the values of the two numbers?

(A) One number is greater than the other.
(B) The cube of one number is 8.
(C) The product of the two numbers is 8.
(D) The difference between the two numbers is 2.
(E) One number is half the other.

29. The rectangular floor of a warehouse is 300 feet wide and 350 feet long. If the width remains fixed, how many additional feet would have to be added to the length to increase the floor area by 20 percent?

(A) 42
(B) 50
(C) 65
(D) 70
(E) 84

30. For which of the following pairs of integers is the least common multiple of the integers minus their greatest common divisor the greatest?

(A) 3, 12
(B) 5, 6
(C) 10, 20
(D) 11, 12
(E) 15, 30

SECTION 6

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-3

In a small hotel, one or more of the chefs are assigned to breakfast duty each day. The chefs are Romain, Simone, and Therese.

No chef can be assigned to breakfast duty two or more days in a row.

1. If Simone and Therese share breakfast duty three times over a five-day period, which of the following must be true?
   (A) Romain is on breakfast duty alone on the first of the five days.
   (B) Romain is on breakfast duty alone on the second of the five days.
   (C) Romain is on breakfast duty alone on the third of the five days.
   (D) Simone and Therese share breakfast duty on the second of the five days.
   (E) Simone and Therese share breakfast duty on the fourth of the five days.

2. If Romain and Simone share breakfast duty on Wednesday of some week, and if Simone and Therese share breakfast duty on Saturday of the same week, which of the following must be true for that week?
   (A) Simone is on breakfast duty alone on Thursday.
   (B) Therese is on breakfast duty alone on Friday.
   (C) Romain and Therese share breakfast duty on Friday.
   (D) Romain is on breakfast duty alone on Thursday, and Simone is on breakfast duty alone on Friday.
   (E) Therese is on breakfast duty alone on Thursday, and Romain is on breakfast duty alone on Friday.

3. Which of the following could be true of some four-day period?
   (A) On three of the four days, pairs of chefs were on breakfast duty.
   (B) On one of the four days, all three chefs were on breakfast duty.
   (C) Simone drew twice as many breakfast assignments as did Therese.
   (D) Romain drew three times as many breakfast assignments as did Simone.
   (E) Both Romain and Simone drew three times as many breakfast assignments as did Therese.

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4. Some geologists argue that if oil is as common in unsampled areas of the world as it is in those already sampled, our current estimate of reserves that exist underground must be multiplied by a factor of 10,000. From this we can conclude that we can meet the oil needs of the entire world for at least five centuries, even assuming that future consumption grows at an accelerating rate.

   To reach the stated conclusion, the author must assume which of the following?

   (A) It is possible to recover the oil contained in unexplored areas of the world.
   (B) The consumption rate for oil will not grow rapidly.
   (C) Oil will remain an important energy source for at least 500 years.
   (D) The world will achieve and maintain zero population growth.
   (E) New technology will make oil discovery and drilling more feasible than ever before.

5. Approximately 5,000 people who have been convicted of nonviolent crimes in the state have been given community-service sentences instead of prison sentences. These offenders perform services commensurate with their training and skills, from scrubbing floors to conducting research for the state. The community-service program, which began in 1979, has grown immensely as a result of drunken-driver legislation enacted a few months ago.

   The introduction of the community-service program in 1979 was most probably prompted by which of the following, all of which occurred during the 1970's?

   (A) A decrease in the number of violent crimes in the state
   (B) An increase in the number of crimes committed by employees of the state
   (C) A gradual decrease in the median age of judges in the state
   (D) The overcrowding of prisons in the state
   (E) The passage of drunken-driver legislation in other states

6. The nuclear polyhedrosis virus helps control gypsy moth populations by killing the moth's larvae. The virus is always present in the larvae, but only every sixth or seventh year does the virus seriously decimate the numbers of larvae, thereby drastically setting back the gypsy moth population. Scientists believe that the virus, ordinarily latent, is triggered only when the larvae experience biological stress.

   If the scientists mentioned above are correct, it can be inferred that the decimation of gypsy moth larvae populations by the nuclear polyhedrosis virus would be most likely to be triggered by which of the following conditions?

   (A) A shift from drought conditions to normal precipitation in areas infested by gypsy moths
   (B) The escalating stress of defoliation sustained by trees attacked by gypsy moths for the second consecutive year
   (C) Predation on larvae of all kinds by parasitic wasps and flies
   (D) Starvation of the gypsy moth larvae as a result of overpopulation
   (E) Spraying of areas infested by gypsy moths with laboratory-raised nuclear polyhedrosis virus

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Questions 7-12

Each of six pegs—P, Q, R, S, T, and U—is placed in a different one of seven holes numbered consecutively 1 through 7 from left to right. The holes are evenly spaced and arranged in a straight line. The placement of the pegs is subject only to the following conditions:

The distance separating P from Q must be the same as the distance separating R from S.
T must be in a hole immediately adjacent to the hole that U is in.
The leftmost hole cannot be the hole that is left empty.

7. Which of the following is a placement of pegs in holes 1 through 7, respectively, in conformity with the conditions above?

(A) Q, empty hole, P, T, U, S, R
(B) Q, R, empty hole, S, P, U, T
(C) S, T, Q, R, U, empty hole, P
(D) S, U, T, P, R, empty hole, Q
(E) S, R, U, T, P, Q, empty hole

8. If U is in hole 2, which of the following must be true?

(A) P is in hole 3.
(B) Q is in hole 4.
(C) R is in hole 5.
(D) S is in hole 7.
(E) T is in hole 1.

9. If U, P, and R are in holes 5, 6, and 7, respectively, which of the following must be true?

(A) S is in hole 1.
(B) S is in hole 2.
(C) Q is in hole 2.
(D) Q is in hole 3.
(E) Hole 2 is the empty hole.

10. If P and R are in holes 1 and 3, respectively, the empty hole must be either

(A) 2 or 4
(B) 2 or 6
(C) 4 or 5
(D) 5 or 7
(E) 6 or 7

11. If P and Q are in holes 2 and 4, respectively, which of the following could be true?

(A) R is in hole 3.
(B) R is in hole 5.
(C) S is in hole 6.
(D) U is in hole 1.
(E) Hole 6 is the empty hole.

12. Of the following, which is a hole that could be the empty hole?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 6

GO ON TO THE NEXT PAGE.

Questions 13-15

Certain plants have the following beneficial or detrimental effects on other plants when planted near them:

Beans and carrots are mutually beneficial, and each is beneficial to peas.
Dill stunts the growth of carrots and of tomatoes.
Onions improve the pest resistance of carrots and of tomatoes but stunt the growth of beans and of peas.
Kohlrabi and tomatoes stunt each other's growth.
Basil improves the growth of tomatoes.

Among the plants listed above, there are no additional beneficial or detrimental effects of nearby planting.

13. In a garden with the plants above, in order for tomatoes to receive the maximum beneficial effect from nearby planting of other plants, tomatoes should be grown near
    (A) peas and carrots but near neither dill nor beans
    (B) basil and onions but near neither kohlrabi nor dill
    (C) onions and kohlrabi but near neither peas nor basil
    (D) beans and kohlrabi but near neither carrots nor onions
    (E) peas and onions but near neither basil nor kohlrabi

14. If adjacent rows of plants are near each other but rows of plants separated by at least one other row are not near each other, in which of the following sequences of rows of plants will there be a detrimental effect between some plants?
    (A) Peas, tomatoes, onions
    (B) Tomatoes, peas, dill
    (C) Tomatoes, peas, kohlrabi
    (D) Onions, carrots, peas
    (E) Onions, peas, kohlrabi

15. If the plants in a group are planted near each other, in which of the following groups of plants will the FEWEST kinds of plants suffer detrimental effects?
    (A) Onions, beans, kohlrabi
    (B) Onions, beans, peas
    (C) Onions, kohlrabi, tomatoes
    (D) Dill, tomatoes, carrots
    (E) Dill, kohlrabi, tomatoes

GO ON TO THE NEXT PAGE.

Questions 16-19

Two display cases, designated case 1 and case 2, are to be used for a display of fossils. The only fossils available are three large ones—J, K, and L—and four small ones—M, N, O, and P. The display must meet the following conditions:

At least six of the fossils must be included in the display.

There must be at least one fossil displayed in each of the two cases.

J and K cannot be displayed in a case together.

J and M, if included in the display, must be in a case together; neither can be included in the display alone.

L and N, if included in the display, must be in a case together; neither can be included in the display alone.

16. Which of the following could be the group of fossils displayed in case 1 ?

(A) J, L, M
(B) J, K, L, O
(C) J, M, N, O
(D) J, M, O, P
(E) K, L, M, N, O

17. Which of the following is NOT an acceptable arrangement for displaying the fossils?

	Case 1	Case 2
(A)	J, L, M, N, P	K, O
(B)	J, M	K, L, N, O, P
(C)	J, M, O	K, L, N, P
(D)	J, M, P	K, L, N, O
(E)	J, O, P	K, L, M, N

18. If J and M are the only fossils displayed in case 1, and K is one of the fossils displayed in case 2, case 2 must also contain

(A) L and N and at least one other fossil
(B) O and P and at least one other fossil
(C) L, N, and O, but not P
(D) L, N, and P, but not O
(E) L, N, O, and P

19. If K is the only large fossil displayed in case 1, which of the following must be true?

(A) Exactly two fossils are displayed in case 1.
(B) No more than five fossils are displayed in case 2.
(C) Case 1 and case 2 each contain exactly two small fossils.
(D) All four small fossils are displayed.
(E) All three large fossils are displayed.

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Questions 20-22

U, V, W, X, Y, and Z are chemical compounds. In any mixture of them in which a reaction is possible, some reaction will occur, and likewise among the products of each reaction, until a nonreactive mixture is produced. The following are the only possible reactions:

One molecule of U instantaneously reacts with one molecule of V to produce one molecule of Y, one of Z, and one of V.

One molecule of W instantaneously reacts with one molecule of X to produce one molecule of V.

Two molecules of Y instantaneously react with one molecule of W to produce one molecule of Z and one of U.

One molecule of X instantaneously reacts with one molecule of U to produce two molecules of W.

Four molecules of Z instantaneously react with one molecule of X to produce one molecule of U and one of Y.

A molecule of a compound cannot be divided into smaller units of that compound.

20. If two molecules of Y, one of W, and one of V are mixed, which of the following accurately lists each individual molecule present in the resultant nonreactive mixture?

(A) U, V, Z
(B) V, Y, Z
(C) U, Y, Z, Z
(D) V, Y, Z, Z
(E) V, Y, Y, Z, Z

21. If three molecules of W, one molecule of X, and three molecules of Y are mixed, how many molecules will be present in the resulting nonreactive mixture?

(A) 4 (B) 5 (C) 6 (D) 7 (E) 8

22. In any mixture in which one or more reactions occur, the number of molecules of which compound will always increase or remain constant?

(A) U (B) V (C) W (D) X (E) Y

23. A research study reports that a particular educational program has improved the prospects for success in later schooling for those children aged three to five who were subjects of the study. It follows, then, that introducing similar programs for all children aged three to five will improve their chances for success in later schooling.

Which of the following, if true, would most weaken the argument above?

(A) The parents of preschool children in the United States are attracted to educational fads and do not have a clear idea of what sorts of early education programs might benefit their children.
(B) The cognitive abilities of children are constantly changing between ages three and five.
(C) The researchers unwittingly included a substantial number of children who had been previously exposed to another educational enrichment program.
(D) Many parents erroneously presume that early formal instruction takes up time that children could better spend exploring their worlds independently.
(E) It would require extraordinary public expense to establish such educational enrichment programs on a national basis.

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24. The school bus always stops at the railroad tracks. When the warning light is not flashing, it then proceeds directly across if the tracks are clear. However, when the warning light is not flashing and the tracks are not clear, the school bus waits until they are clear and then proceeds immediately across them.

If the statements above are true and it is true that the school bus stops at the tracks and then does not proceed to cross them, which of the following must also be true?

(A) The warning light is flashing and the tracks are clear.
(B) The warning light is flashing and the tracks are not clear.
(C) The warning light is not flashing and the tracks are not clear.
(D) The warning light is flashing, or the tracks are not clear, or both.
(E) The warning light is not flashing, or the tracks are not clear, or both.

25. Konstantin Stanislavski's justly praised method for training actors arose from Stanislavski's own awkwardness and susceptibility to theatrical clichés as a young actor. The "method" must be understood in terms of Stanislavski's personal search for release from the temptations of stock gestures, well-tried vocal intonations, and standard emotional formulas. Despite the pretensions of certain of his disciples in the United States, the Russian director never intended to formulate a textbook of rigid solutions to acting problems.

It can be inferred that the author of the preceding statements about Stanislavski's method holds which of the following opinions about acting?

(A) Acting is essentially spontaneous emotional expression, with which systematic training usually interferes.
(B) The Stanislavski method has lost some of its flexibility and exploratory qualities as it has been used by some followers of Stanislavski in the United States.
(C) The Stanislavski method has misled those actors in the United States who have adopted it.
(D) Virtually the only advice young actors need be given is that they must systematically suppress theatrical clichés in their performances.
(E) The Stanislavski method is useful primarily for young actors who must overcome artificiality and immaturity in their performances.

FOR GENERAL TEST 23 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 1			Section 4		
Number	Answer	P+	Number	Answer	P+
1	D	90	1	C	91
2	A	75	2	C	60
3	A	74	3	D	58
4	C	70	4	D	45
5	C	56	5	E	53
6	C	65	6	E	38
7	E	40	7	E	36
8	A	89	8	B	82
9	E	66	9	D	75
10	E	54	10	B	62
11	A	48	11	D	54
12	B	54	12	E	49
13	E	53	13	B	44
14	B	45	14	D	47
15	C	33	15	A	45
16	E	21	16	C	42
17	B	74	17	B	78
18	A	54	18	B	60
19	B	69	19	A	56
20	A	64	20	E	82
21	D	76	21	B	62
22	A	41	22	D	38
23	E	42	23	D	85
24	B	77	24	A	35
25	C	45	25	D	52
26	D	63	26	E	11
27	E	47	27	E	15
28	A	91	28	E	90
29	A	81	29	D	93
30	C	75	30	B	81
31	D	70	31	B	80
32	A	67	32	E	64
33	E	51	33	C	61
34	C	33	34	A	41
35	A	27	35	E	32
36	E	28	36	A	31
37	D	24	37	E	22
38	B	16	38	C	21

QUANTITATIVE ABILITY					
Section 2			Section 5		
Number	Answer	P+	Number	Answer	P+
1	C	91	1	A	88
2	C	86	2	C	92
3	A	85	3	B	84
4	B	77	4	A	85
5	A	76	5	C	76
6	B	68	6	B	72
7	B	53	7	A	67
8	D	77	8	C	66
9	C	68	9	A	59
10	A	66	10	C	53
11	D	57	11	B	57
12	D	19	12	D	54
13	B	45	13	C	48
14	A	38	14	D	43
15	D	33	15	A	27
16	C	96	16	D	94
17	C	92	17	E	91
18	D	90	18	B	91
19	B	86	19	C	89
20	D	75	20	B	82
21	A	88	21	A	70
22	D	52	22	D	63
23	B	64	23	E	75
24	E	18	24	A	22
25	B	50	25	E	39
26	C	70	26	B	73
27	C	54	27	C	60
28	E	37	28	A	72
29	C	27	29	D	52
30	D	37	30	D	36

ANALYTICAL ABILITY					
Section 3			Section 6		
Number	Answer	P+	Number	Answer	P+
1	D	53	1	B	67
2	A	92	2	E	67
3	C	85	3	C	53
4	E	73	4	A	75
5	B	71	5	D	70
6	C	66	6	D	42
7	D	49	7	E	82
8	E	74	8	E	80
9	C	94	9	B	56
10	A	65	10	D	62
11	E	40	11	A	67
12	B	76	12	C	45
13	C	55	13	B	85
14	D	81	14	E	47
15	A	68	15	A	42
16	E	71	16	D	64
17	A	47	17	E	56
18	B	58	18	A	44
19	A	54	19	E	21
20	A	31	20	D	17
21	D	38	21	C	29
22	E	19	22	B	33
23	D	47	23	C	49
24	C	40	24	D	39
25	B	34	25	B	35

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 23 ONLY AND THE PERCENTS BELOW*

Raw Score	Scaled Scores and Percents Below*						Raw Score	Scaled Scores and Percents Below*					
	Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below		Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below
73-76	800	99					40	450	43	570	53	700	91
72	790	99					39	440	40	560	51	690	89
71	780	99					38	430	37	540	46	670	86
70	770	99					37	420	34	530	43	660	84
69	760	99					36	410	31	520	41	640	80
68	740	98					35	410	31	500	36	630	78
67	730	97					34	400	28	490	34	610	74
66	720	96					33	390	26	480	31	600	71
65	710	96					32	380	24	460	27	580	66
64	700	95					31	370	22	450	25	570	63
63	680	93					30	360	18	440	23	550	58
62	670	92					29	360	18	420	19	540	55
61	660	91					28	350	16	410	17	520	48
60	650	89	800	98			27	340	14	400	16	510	45
59	640	88	800	98			26	330	12	380	12	490	40
58	630	86	800	98			25	320	10	370	11	480	37
57	620	85	790	97			24	310	9	360	10	460	32
56	610	83	780	96			23	310	9	340	7	450	29
55	590	80	770	95			22	300	7	330	6	430	24
54	580	78	750	91			21	290	6	320	5	420	22
53	570	75	740	90			20	280	5	300	4	400	18
52	560	73	730	88			19	270	4	290	3	390	16
51	550	71	710	84			18	260	3	280	2	370	12
50	540	68	700	82	800	99	17	250	2	260	2	360	11
49	530	65	690	80	800	99	16	240	1	250	1	340	8
48	520	63	670	76	800	99	15	230	1	240	1	330	7
47	510	60	660	74	800	99	14	220	1	220	0	310	5
46	500	57	650	72	790	98	13	210	0	210	0	300	4
45	490	55	630	67	780	98	12	200	0	200	0	280	3
44	480	52	620	65	760	97	11	200	0	200	0	270	2
43	470	49	610	62	750	96	10	200	0	200	0	250	1
42	470	49	590	58	730	94	9	200	0	200	0	240	1
41	460	46	580	55	720	93	8	200	0	200	0	220	1
							7	200	0	200	0	210	0
							0-6	200	0	200	0	200	0

*Percent scoring below the scaled score based on the performance of the 844,960 examinees who took the General Test between October 1, 1984, and September 30, 1987.

TEST 24

SECTION 1

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Clearly refuting sceptics, researchers have ------- not only that gravitational radiation exists but that it also does exactly what theory ------- it should do.

   (A) doubted. .warranted
   (B) estimated. .accepted
   (C) demonstrated. .predicted
   (D) assumed. .deduced
   (E) supposed. .asserted

2. Sponsors of the bill were ------- because there was no opposition to it within the legislature until after the measure had been signed into law.

   (A) unreliable (B) well-intentioned
   (C) persistent (D) relieved (E) detained

3. The paradoxical aspect of the myths about Demeter, when we consider the predominant image of her as a tranquil and serene goddess, is her ------- search for her daughter.

   (A) extended
   (B) agitated
   (C) comprehensive
   (D) motiveless
   (E) heartless

4. Yellow fever, the disease that killed 4,000 Philadelphians in 1793, and so ------- Memphis, Tennessee, that the city lost its charter, has reappeared after nearly two decades in ------- in the Western Hemisphere.

   (A) terrorized. .contention
   (B) ravaged. .secret
   (C) disabled. .quarantine
   (D) corrupted. .quiescence
   (E) decimated. .abeyance

5. Although -------, almost self-effacing in his private life, he displays in his plays and essays a strong ------- publicity and controversy.

   (A) conventional. .interest in
   (B) monotonous. .reliance on
   (C) shy. .aversion toward
   (D) retiring. .penchant for
   (E) evasive. .impatience with

6. Comparatively few rock musicians are willing to laugh at themselves, although a hint of ------- can boost sales of video clips very nicely.

   (A) self-deprecation
   (B) congeniality
   (C) cynicism
   (D) embarrassment
   (E) self-doubt

7. Parts of seventeenth-century Chinese pleasure gardens were not necessarily intended to look -------; they were designed expressly to evoke the agreeable melancholy resulting from a sense of the ------- of natural beauty and human glory.

   (A) beautiful. .immutability
   (B) cheerful. .transitoriness
   (C) colorful. .abstractness
   (D) luxuriant. .simplicity
   (E) conventional. .wildness

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. APPLE : SKIN :: (A) potato : tuber
(B) melon : rind (C) tomato : fruit
(D) maize : cob (E) rhubarb : leafstalk

9. FIRE : INFERNO ::
(A) speech : shout
(B) wind : temperature
(C) storm : hurricane
(D) whale : minnow
(E) plant : flower

10. BODYGUARD : PERSON ::
(A) police officer : traffic (B) teacher : pupil
(C) mayor : city (D) soldier : country
(E) secretary : office

11. LOPE : RUN :: (A) uncover : lose
(B) view : see (C) sigh : moan
(D) chew : drink (E) drawl : speak

12. HOAX : DECEIVE ::
(A) scandal : vilify
(B) lottery : disburse
(C) gimmick : wheedle
(D) filibuster : delay
(E) boast : cajole

13. ALCOVE : RECESS ::
(A) turret : chimney (B) dome : roof
(C) column : entrance (D) foyer : ballroom
(E) foundation : building

14. BALLAST : INSTABILITY ::
(A) buoy : direction (B) purchase : slippage
(C) lathe : metal (D) pulley : leverage
(E) hoist : elevator

15. MUFFLE : SOUND :: (A) assuage : grief
(B) maul : object (C) extract : flavor
(D) endure : agony (E) conceal : secret

16. MITIGATE : SEVERE ::
(A) compile : available
(B) restore : new
(C) contribute : charitable
(D) venerate : reverent
(E) qualify : general

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

A Marxist sociologist has argued that racism stems from the class struggle that is unique to the capitalist system—that racial prejudice is generated by capitalists as a means of controlling workers. His thesis works relatively well when applied to discrimination against Blacks in the United States, but his definition of racial prejudice as "racially-based negative prejudgments against a group generally accepted as a race in any given region of ethnic competition," can be interpreted as also including hostility toward such ethnic groups as the Chinese in California and the Jews in medieval Europe. However, since prejudice against these latter peoples was not inspired by capitalists, he has to reason that such antagonisms were not really based on race. He disposes thusly (albeit unconvincingly) of both the intolerance faced by Jews before the rise of capitalism and the early twentieth-century discrimination against Oriental people in California, which, inconveniently, was instigated by workers.

17. The passage supplies information that would answer which of the following questions?

    (A) What accounts for the prejudice against the Jews in medieval Europe?
    (B) What conditions caused the discrimination against Oriental people in California in the early twentieth century?
    (C) Which groups are not in ethnic competition with each other in the United States?
    (D) What explanation did the Marxist sociologist give for the existence of racial prejudice?
    (E) What evidence did the Marxist sociologist provide to support his thesis?

18. The author considers the Marxist sociologist's thesis about the origins of racial prejudice to be

    (A) unoriginal
    (B) unpersuasive
    (C) offensive
    (D) obscure
    (E) speculative

19. It can be inferred from the passage that the Marxist sociologist would argue that in a noncapitalist society racial prejudice would be

    (A) pervasive
    (B) tolerated
    (C) ignored
    (D) forbidden
    (E) nonexistent

20. According to the passage, the Marxist sociologist's chain of reasoning required him to assert that prejudice toward Oriental people in California was

    (A) directed primarily against the Chinese
    (B) similar in origin to prejudice against the Jews
    (C) understood by Oriental people as ethnic competition
    (D) provoked by workers
    (E) nonracial in character

GO ON TO THE NEXT PAGE.

By 1950, the results of attempts to relate brain processes to mental experience appeared rather discouraging. Such variations in size, shape, chemistry, conduction speed, excitation threshold, and the like as had been demonstrated in nerve cells remained negligible in significance for any possible correlation with the manifold dimensions of mental experience.

Near the turn of the century, it had been suggested by Hering that different modes of sensation, such as pain, taste, and color, might be correlated with the discharge of specific kinds of nervous energy. However, subsequently developed methods of recording and analyzing nerve potentials failed to reveal any such qualitative diversity. It was possible to demonstrate by other methods refined structural differences among neuron types; however, proof was lacking that the quality of the impulse or its conduction was influenced by these differences, which seemed instead to influence the developmental patterning of the neural circuits. Although qualitative variance among nerve energies was never rigidly disproved, the doctrine was generally abandoned in favor of the opposing view, namely, that nerve impulses are essentially homogeneous in quality and are transmitted as "common currency" throughout the nervous system. According to this theory, it is not the quality of the sensory nerve impulses that determines the diverse conscious sensations they produce, but rather the different areas of the brain into which they discharge, and there is some evidence for this view. In one experiment, when an electric stimulus was applied to a given sensory field of the cerebral cortex of a conscious human subject, it produced a sensation of the appropriate modality for that particular locus, that is, a visual sensation from the visual cortex, an auditory sensation from the auditory cortex, and so on. Other experiments revealed slight variations in the size, number, arrangement, and interconnection of the nerve cells, but as far as psychoneural correlations were concerned, the obvious similarities of these sensory fields to each other seemed much more remarkable than any of the minute differences.

However, cortical locus, in itself, turned out to have little explanatory value. Studies showed that sensations as diverse as those of red, black, green, and white, or touch, cold, warmth, movement, pain, posture, and pressure apparently may arise through activation of the same cortical areas. What seemed to remain was some kind of differential patterning effects in the brain excitation: it is the difference in the central distribution of impulses that counts. In short, brain theory suggested a correlation between mental experience and the activity of relatively homogeneous nerve-cell units conducting essentially homogeneous impulses through homogeneous cerebral tissue. To match the multiple dimensions of mental experience psychologists could only point to a limitless variation in the spatiotemporal patterning of nerve impulses.

21. The author suggests that, by 1950, attempts to correlate mental experience with brain processes would probably have been viewed with

(A) indignation (B) impatience (C) pessimism (D) indifference (E) defiance

22. The author mentions "common currency" in line 26 primarily in order to emphasize the

(A) lack of differentiation among nerve impulses in human beings
(B) similarity of the sensations that all human beings experience
(C) similarities in the views of scientists who have studied the human nervous system
(D) continuous passage of nerve impulses through the nervous system
(E) recurrent questioning by scientists of an accepted explanation about the nervous system

23. The description in lines 32-38 of an experiment in which electric stimuli were applied to different sensory fields of the cerebral cortex tends to support the theory that

(A) the simple presence of different cortical areas cannot account for the diversity of mental experience
(B) variation in spatiotemporal patterning of nerve impulses correlates with variation in subjective experience
(C) nerve impulses are essentially homogeneous and are relatively unaffected as they travel through the nervous system
(D) the mental experiences produced by sensory nerve impulses are determined by the cortical area activated
(E) variation in neuron types affects the quality of nerve impulses

GO ON TO THE NEXT PAGE.

24. According to the passage, some evidence exists that the area of the cortex activated by a sensory stimulus determines which of the following?

I. The nature of the nerve impulse
II. The modality of the sensory experience
III. Qualitative differences within a modality

(A) II only (B) III only (C) I and II only
(D) II and III only (E) I, II, and III

25. The passage can most accurately be described as a discussion concerning historical views of the

(A) anatomy of the brain
(B) manner in which nerve impulses are conducted
(C) significance of different cortical areas in mental experience
(D) mechanics of sense perception
(E) physiological correlates of mental experience

26. Which of the following best summarizes the author's opinion of the suggestion that different areas of the brain determine perceptions produced by sensory nerve impulses?

(A) It is a plausible explanation, but it has not been completely proved.
(B) It is the best explanation of brain processes currently available.
(C) It is disproved by the fact that the various areas of the brain are physiologically very similar.
(D) There is some evidence to support it, but it fails to explain the diversity of mental experience.
(E) There is experimental evidence that confirms its correctness.

27. It can be inferred from the passage that which of the following exhibit the LEAST qualitative variation?

(A) Nerve cells
(B) Nerve impulses
(C) Cortical areas
(D) Spatial patterns of nerve impulses
(E) Temporal patterns of nerve impulses

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. LAG: (A) look around (B) dodge easily
(C) seem hard (D) forge ahead
(E) change radically

29. RANDOMIZE: (A) distribute (B) analyze
(C) systematize (D) blend (E) prepare

30. SURCHARGE: (A) loss (B) liability
(C) decrease (D) shortfall (E) discount

31. SYNCHRONOUS: (A) off-key
(B) out-of-shape (C) without pity
(D) out-of-phase (E) without difficulty

32. PROFUSE: (A) recurrent (B) rare
(C) comprehensible (D) scanty (E) flawed

33. INERTIA:
(A) short duration
(B) massless particle
(C) resistant medium
(D) ability to maintain pressure
(E) tendency to change motion

34. DIN: (A) silence (B) slowness
(C) sharpness (D) essence (E) repose

35. GAUCHENESS: (A) probity (B) sophistry
(C) acumen (D) polish (E) vigor

36. INCHOATE: (A) sordid (B) modern
(C) improvised (D) exceptionally quick
(E) completely formed

37. ENDEMIC: (A) exotic (B) shallow
(C) episodic (D) manifest (E) treatable

38. REDOUBTABLE: (A) unsurprising
(B) unambiguous (C) unimpressive
(D) inevitable (E) immovable

SECTION 2
Time—30 minutes
38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Since it is now ------- to build the complex central processing unit of a computer on a single silicon chip using photolithography and chemical etching, it seems plausible that other miniature structures might be fabricated in ------- ways.

   (A) unprecedented. .undiscovered
   (B) difficult. .related
   (C) permitted. .unique
   (D) mandatory. .congruent
   (E) routine. .similar

2. Given the evidence of Egyptian and Babylonian ------- later Greek civilization, it would be incorrect to view the work of Greek scientists as an entirely independent creation.

   (A) disdain for
   (B) imitation of
   (C) ambivalence about
   (D) deference to
   (E) influence on

3. Laws do not ensure social order since laws can always be -------, which makes them ------- unless the authorities have the will and the power to detect and punish wrongdoing.

   (A) contested. .provisional
   (B) circumvented. .antiquated
   (C) repealed. .vulnerable
   (D) violated. .ineffective
   (E) modified. .unstable

4. Since she believed him to be both candid and trustworthy, she refused to consider the possibility that his statement had been -------.

   (A) irrelevant (B) facetious (C) mistaken
   (D) critical (E) insincere

5. Ironically, the party leaders encountered no greater ------- their efforts to build a progressive party than the ------- of the progressives already elected to the legislature.

   (A) support for. .advocacy
   (B) threat to. .promise
   (C) benefit from. .success
   (D) obstacle to. .resistance
   (E) praise for. .reputation

6. It is strange how words shape our thoughts and trap us at the bottom of deeply ------- canyons of thinking, their imprisoning sides carved out by the ------- of past usage.

   (A) cleaved. .eruptions
   (B) rooted. .flood
   (C) incised. .river
   (D) ridged. .ocean
   (E) notched. .mountains

7. That his intransigence in making decisions ------- no open disagreement from any quarter was well known; thus, clever subordinates learned the art of ------- their opinions in casual remarks.

   (A) elicited. .quashing
   (B) engendered. .recasting
   (C) brooked. .intimating
   (D) embodied. .instigating
   (E) forbore. .emending

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. BABBLE : TALK :: (A) chisel : sculpt
(B) harmonize : sing (C) scribble : write
(D) hint : imply (E) quibble : elude

9. SYLLABUS : COURSE :: (A) rules : jury
(B) map : destination (C) recipe : ingredients
(D) appetizer : meal (E) agenda : meeting

10. VARNISH : WOOD ::
(A) etch : glass
(B) tarnish : silver
(C) wax : linoleum
(D) burnish : metal
(E) bleach : fabric

11. PITCH : SOUND :: (A) color : light
(B) mass : weight (C) force : pressure
(D) energy : heat (E) velocity : time

12. DISCOMFITED : BLUSH ::
(A) nonplussed : weep (B) contemptuous : sneer
(C) affronted : blink (D) sullen : groan
(E) aggrieved : gloat

13. INVINCIBLE : SUBDUED ::
(A) inconsistent : expressed
(B) impervious : damaged
(C) imprudent : enacted
(D) bolted : separated
(E) expensive : bought

14. STRIATED : GROOVE ::
(A) adorned : detail
(B) woven : texture
(C) engraved : curve
(D) constructed : design
(E) braided : strand

15. DOGGEREL : VERSE :: (A) burlesque : play
(B) sketch : drawing (C) operetta : symphony
(D) fable : narration (E) limerick : sonnet

16. DROLL : LAUGH :: (A) grisly : flinch
(B) bland : tire (C) shrill : shriek
(D) coy : falter (E) wily : smirk

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

The transfer of heat and water vapor from the ocean to the air above it depends on a disequilibrium at the interface of the water and the air. Within about a millimeter of the water, air temperature is close to that of the surface water, and the air is nearly saturated with water vapor. But the differences, however small, are crucial, and the disequilibrium is maintained by air near the surface mixing with air higher up, which is typically appreciably cooler and lower in water-vapor content. The air is mixed by means of turbulence that depends on the wind for its energy. As wind speed increases, so does turbulence, and thus the rate of heat and moisture transfer. Detailed understanding of this phenomenon awaits further study. An interacting—and complicating—phenomenon is wind-to-water transfer of momentum that occurs when waves are formed. When the wind makes waves, it transfers important amounts of energy—energy that is therefore not available to provide turbulence.

17. The primary purpose of the passage is to

(A) resolve a controversy
(B) describe a phenomenon
(C) outline a theory
(D) confirm research findings
(E) classify various observations

18. According to the passage, wind over the ocean generally does which of the following?

I. Causes relatively cool, dry air to come into proximity with the ocean surface.
II. Maintains a steady rate of heat and moisture transfer between the ocean and the air.
III. Causes frequent changes in the temperature of the water at the ocean's surface.

(A) I only
(B) II only
(C) I and II only
(D) II and III only
(E) I, II, and III

19. It can be inferred from the passage that the author regards current knowledge about heat and moisture transfer from the ocean to air as

(A) revolutionary
(B) inconsequential
(C) outdated
(D) derivative
(E) incomplete

20. The passage suggests that if on a certain day the wind were to decrease until there was no wind at all, which of the following would occur?

(A) The air closest to the ocean surface would become saturated with water vapor.
(B) The air closest to the ocean surface would be warmer than the water.
(C) The amount of moisture in the air closest to the ocean surface would decrease.
(D) The rate of heat and moisture transfer would increase.
(E) The air closest to the ocean would be at the same temperature as air higher up.

GO ON TO THE NEXT PAGE.

Extraordinary creative activity has been characterized as revolutionary, flying in the face of what is established and producing not what is acceptable but what will become accepted. According to this formulation, highly creative activity transcends the limits of an existing form and establishes a new principle of organization. However, the idea that extraordinary creativity transcends established limits is misleading when it is applied to the arts, even though it may be valid for the sciences. Differences between highly creative art and highly creative science arise in part from a difference in their goals. For the sciences, a new theory is the goal and end result of the creative act. Innovative science produces new propositions in terms of which diverse phenomena can be related to one another in more coherent ways. Such phenomena as a brilliant diamond or a nesting bird are relegated to the role of data, serving as the means for formulating or testing a new theory. The goal of highly creative art is very different: the phenomenon itself becomes the direct product of the creative act. Shakespeare's *Hamlet* is not a tract about the behavior of indecisive princes or the uses of political power; nor is Picasso's painting *Guernica* primarily a propositional statement about the Spanish Civil War or the evils of fascism. What highly creative artistic activity produces is not a new generalization that transcends established limits, but rather an aesthetic particular. Aesthetic particulars produced by the highly creative artist extend or exploit, in an innovative way, the limits of an existing form, rather than transcend that form.

This is not to deny that a highly creative artist sometimes establishes a new principle of organization in the history of an artistic field; the composer Monteverdi, who created music of the highest aesthetic value, comes to mind. More generally, however, whether or not a composition establishes a new principle in the history of music has little bearing on its aesthetic worth. Because they embody a new principle of organization, some musical works, such as the operas of the Florentine Camerata, are of signal historical importance, but few listeners or musicologists would include these among the great works of music. On the other hand, Mozart's *The Marriage of Figaro* is surely among the masterpieces of music even though its modest innovations are confined to extending existing means. It has been said of Beethoven that he toppled the rules and freed music from the stifling confines of convention. But a close study of his compositions reveals that Beethoven overturned no fundamental rules. Rather, he was an incomparable strategist who exploited limits—the rules, forms, and conventions that he inherited from predecessors such as Haydn and Mozart, Handel and Bach—in strikingly original ways.

21. The author considers a new theory that coherently relates diverse phenomena to one another to be the

(A) basis for reaffirming a well-established scientific formulation
(B) byproduct of an aesthetic experience
(C) tool used by a scientist to discover a new particular
(D) synthesis underlying a great work of art
(E) result of highly creative scientific activity

22. The author implies that Beethoven's music was strikingly original because Beethoven

(A) strove to outdo his predecessors by becoming the first composer to exploit limits
(B) fundamentally changed the musical forms of his predecessors by adopting a richly inventive strategy
(C) embellished and interwove the melodies of several of the great composers who preceded him
(D) manipulated the established conventions of musical composition in a highly innovative fashion
(E) attempted to create the illusion of having transcended the musical forms of his predecessors

23. The passage states that the operas of the Florentine Camerata are

(A) unjustifiably ignored by musicologists
(B) not generally considered to be of high aesthetic value even though they are important in the history of music
(C) among those works in which popular historical themes were portrayed in a musical production
(D) often inappropriately cited as examples of musical works in which a new principle of organization was introduced
(E) minor exceptions to the well-established generalization that the aesthetic worth of a composition determines its importance in the history of music

GO ON TO THE NEXT PAGE.

24. The passage supplies information for answering all of the following questions EXCEPT:

(A) Has unusual creative activity been characterized as revolutionary?
(B) Did Beethoven work within a musical tradition that also included Handel and Bach?
(C) Is Mozart's *The Marriage of Figaro* an example of a creative work that transcended limits?
(D) Who besides Monteverdi wrote music that the author would consider to embody new principles of organization and to be of high aesthetic value?
(E) Does anyone claim that the goal of extraordinary creative activity in the arts differs from that of extraordinary creative activity in the sciences?

25. The author regards the idea that all highly creative artistic activity transcends limits with

(A) deep skepticism
(B) strong indignation
(C) marked indifference
(D) moderate amusement
(E) sharp derision

26. The author implies that an innovative scientific contribution is one that

(A) is cited with high frequency in the publications of other scientists
(B) is accepted immediately by the scientific community
(C) does not relegate particulars to the role of data
(D) presents the discovery of a new scientific fact
(E) introduces a new valid generalization

27. Which of the following statements would most logically conclude the last paragraph of the passage?

(A) Unlike Beethoven, however, even the greatest of modern composers, such as Stravinsky, did not transcend existing musical forms.
(B) In similar fashion, existing musical forms were even further exploited by the next generation of great European composers.
(C) Thus, many of the great composers displayed the same combination of talents exhibited by Monteverdi.
(D) By contrast, the view that creativity in the arts exploits but does not transcend limits is supported in the field of literature.
(E) Actually, Beethoven's most original works were largely unappreciated at the time that they were first performed.

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. BRILLIANCE: (A) dullness (B) emptiness (C) awkwardness (D) state of immobility (E) excess of information

29. QUANDARY:
(A) state of suppressed enmity
(B) state of complete certainty
(C) state of mild hysteria
(D) state of unprovoked anger
(E) state of feeble opposition

30. AGGREGATE:
(A) altered plans
(B) intended actions
(C) unexplained occurrences
(D) isolated units
(E) unfounded conclusions

31. SUBSTANTIATION: (A) disproof (B) dissent (C) delusion (D) debate (E) denial

32. IMPUDENT: (A) compelling (B) mature (C) respectful (D) thorough (E) deliberate

33. RECANT: (A) propose (B) respond (C) instruct (D) affirm (E) disclose

34. DIVEST: (A) multiply (B) initiate (C) triumph (D) persist (E) endow

35. BANALITY:
(A) accurate portrayal
(B) impromptu statement
(C) original expression
(D) succinct interpretation
(E) elaborate critique

36. UBIQUITOUS: (A) uniform (B) unanimous (C) unique (D) anachronistic (E) mediocre

37. ESCHEW: (A) invest (B) consume (C) maintain (D) condemn (E) seek

38. BELIE: (A) flaunt (B) distend (C) attune (D) obviate (E) aver

SECTION 3
Time—30 minutes
30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

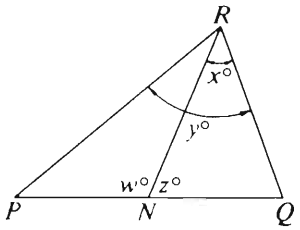
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

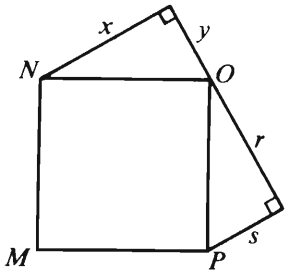


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	The value of $(x-5)^2$ when $x=8$	6



MNOP is a square.

2.	x^2+y^2	r^2+s^2

$a^2-3b=7$
$a=4$

3.	a	b

4.	$\sqrt{\sqrt{100}}$	5

Of 65 people polled, 20 percent said that, given the choice among the three colors red, blue, and green, they preferred the color blue.

5.	The number of people who said they preferred the color blue	One-half the number of people who said they preferred the color green

	Column A	Column B
6.	$\frac{7\times 0}{7+0}$	$\frac{1}{7}$

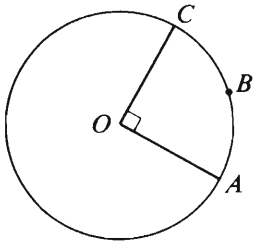
$x>0$ and $y>0$

7.	$(2+x)(3+y)$	$6+xy$

$$\begin{array}{r} 6 \\ 754\overline{)453\square} \\ 452\triangle \\ \hline 8 \end{array}$$

In the correctly worked division problem above, each of the symbols $\square$ and $\triangle$ represents a digit.

8.	$\square$	$\triangle$



O is the center of the circle, and the length of arc ABC is 5.

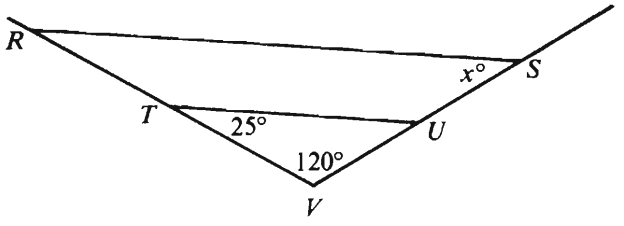
9.	The circumference of the circle	5π

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	Joanne purchased p pencils and Steve purchased 3 more than half as many pencils as Joanne.	
10.	The number of pencils Steve purchased	$\frac{p+6}{2}$

	Column A	Column B
11.	The volume of a can that is a right circular cylinder with radius of 5 centimeters	The volume of a can that is a right circular cylinder with radius of 4 centimeters



$RT = TV$; $VU = US$

12.	x		30

	Column A	Column B
	$\frac{125(625)}{25} = 5^N$	
13.	N	5

$x \neq 0$

$\frac{3}{x} + \frac{1}{4} = \frac{1}{2x}$

14.	x	-5

The lengths of two sides of isosceles $\triangle ABC$ are 9 and 15.

15.	The perimeter of $\triangle ABC$	33

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. If $\frac{x}{y} = \frac{3}{4}$, then $\frac{x+y}{y} =$

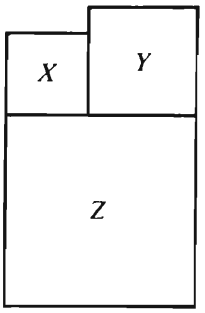
(A) $\frac{3}{7}$ (B) $\frac{4}{7}$ (C) 1 (D) $\frac{11}{7}$ (E) $\frac{7}{4}$

17. Which of the following numbers is both a factor of 48 and a multiple of 6 ?

(A) 2 (B) 8 (C) 12 (D) 16 (E) 18

18. If $2^n = 32$, then $n^2 =$

(A) 25
(B) 32
(C) 64
(D) 256
(E) 1,024



19. The figure above shows how three square flower beds X, Y, and Z are situated. If the area of X is 36 square meters and the area of Y is 64 square meters, what is the area, in square meters, of Z ?

(A) 100
(B) 169
(C) 196
(D) 200
(E) 225

20. In a certain room, all except 18 of the people are over 50 years of age. If 15 of the people in the room are under 50 years of age, how many people are in the room?

(A) 27
(B) 30
(C) 33
(D) 36
(E) It cannot be determined from the information given.

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following chart and information.

LAST WEEK'S TOTAL HOURS WORKED AND HOURLY WAGES FOR THE CASHIERS AT MARKET *X*

Cashier	Hourly Wage	Total Hours Worked
P	$4.25	40
Q	4.75	32
R	5.00	26
S	5.50	25
T	5.50	22

Note: Last week no more than two cashiers worked at any one time, no cashier worked more than 12 hours on the same day, and on each day each cashier worked continuously.

21. What was the average (arithmetic mean) number of hours that the five cashiers worked last week?

(A) 25
(B) 26
(C) 27
(D) 29
(E) 30

22. What is the least possible number of days on which Cashier *R* could have worked last week?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

23. On Saturday of last week, Market *X* was open for 15 hours and exactly four cashiers worked. What was the greatest possible amount that the market could have paid in cashiers' wages for that day?

(A) $132.00
(B) $157.50
(C) $161.25
(D) $163.00
(E) $165.00

24. If Market *X* is open 96 hours per week, for how many hours last week were two cashiers working at the same time?

(A) 49 (B) 48 (C) 36 (D) 24 (E) 12

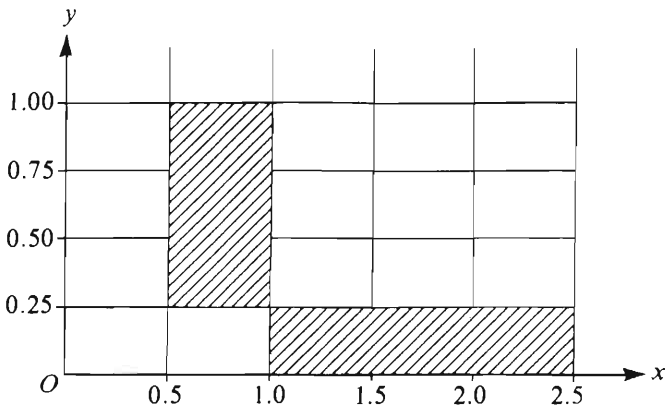
25. If Cashier *S*'s hourly wage were to increase by 10 percent and *S*'s weekly hours were to decrease by 10 percent from last week's total hours, what would be the change, if any, in *S*'s total weekly wage?

(A) An increase of $1.37
(B) An increase of $0.55
(C) No change
(D) A decrease of $0.55
(E) A decrease of $1.37

GO ON TO THE NEXT PAGE.

26. $|-2|+|7|+|-2+7| =$

(A) 18
(B) 14
(C) 10
(D) 5
(E) 0

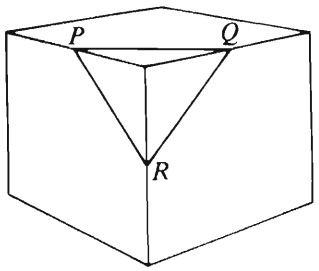


27. What is the sum of the areas of the shaded rectangular regions shown in the figure above?

(A) 3.0 (B) 2.5 (C) 1.5
(D) 1.125 (E) 0.75

28. A time-study specialist has set the production rate for each worker on a certain job at 22 units every 3 hours. At this rate what is the minimum number of workers that should be put on the job if at least 90 units are to be produced per hour?

(A) 5
(B) 8
(C) 12
(D) 13
(E) 30



29. The volume of the cube in the figure above is 64. If the vertices of $\triangle PQR$ are midpoints of the cube's edges, what is the perimeter of $\triangle PQR$?

(A) 6
(B) $6\sqrt{2}$
(C) $6\sqrt{3}$
(D) 12
(E) $12\sqrt{2}$

30. 3×10^4 is greater than 4×10^3 by what percent?

(A) 25%
(B) 75%
(C) $133\frac{1}{3}\%$
(D) 650%
(E) 750%

SECTION 4

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

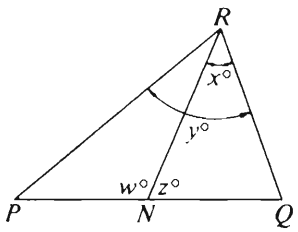
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

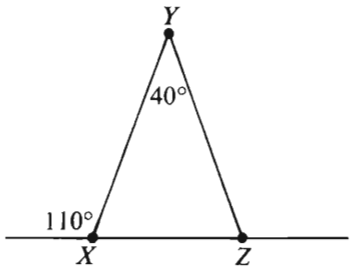


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

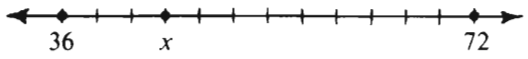
GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	$74x + 18$	92
2.	The number of hours required to travel 1,500 miles at an average speed of 400 miles per hour	The number of hours required to travel 200 miles at an average speed of 50 miles per hour
3.	The number of shares of stock X purchased for \$1,581,000	The number of shares of stock Y purchased for \$1,603,000



4.	XY	YZ

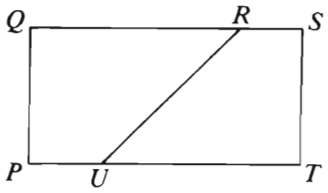


Note: Drawn to scale.

5.	x on the number line above	44

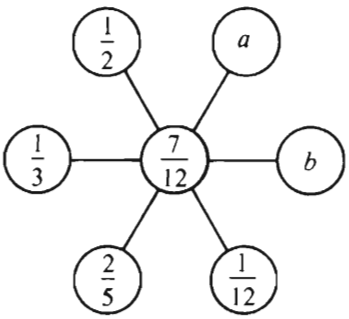
$x < 0$

	Column A	Column B
6.	$1 - x$	$x - 1$



The area of rectangular region $PQST$ is 32.

	Column A	Column B
7.	The area of region $PQRU$	The area of region $RSTU$



The sum of each pair of numbers in diametrically opposite positions is equal to the number in the center.

	Column A	Column B
8.	a	b

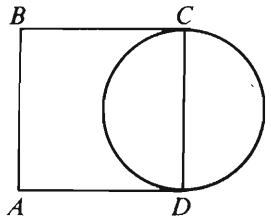
GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
9.	$\dfrac{1}{\frac{1}{3}+\frac{1}{5}+\frac{1}{7}}$	$\frac{1}{3}+\frac{1}{5}+\frac{1}{7}$

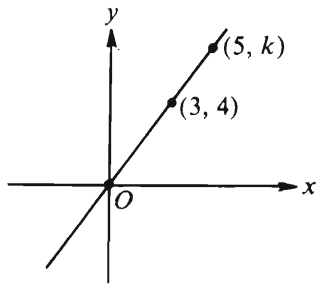
A sealed rectangular tank, which has inside dimensions of 30 by 40 by 50 centimeters, is partially full of water.

	Column A	Column B
10.	The depth of the water when the tank is level and rests on one of its 30- by 50-centimeter faces	The depth of the water when the tank is level and rests on one of its 30- by 40-centimeter faces
11.	$(4+\sqrt{5})(4-\sqrt{5})$	$(-\sqrt{5}-4)(\sqrt{5}-4)$



	Column A	Column B
12.	The area of the circular region with diameter CD	$\frac{3}{4}$ of the area of square region $ABCD$

	Column A	Column B
	n is a positive integer.	
13.	$(0.9)^n$	$\frac{1}{2}$



	Column A	Column B
14.	k	6
15.	$8^{24}-8^{23}$	$8^{23}(7)$

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. A linen shop has a certain tablecloth that is available in 8 sizes and 10 colors. What is the maximum possible number of different combinations of size and color available?

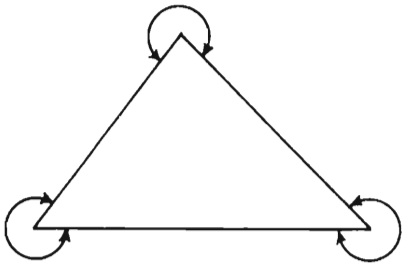
(A) 9
(B) 18
(C) 40
(D) 80
(E) 90

17. If $1 - x = 1 + 3x$, then $x =$

(A) 0 (B) $\frac{1}{4}$ (C) $\frac{1}{2}$ (D) $\frac{2}{3}$ (E) 1

18. $\frac{3}{2} + \frac{2}{3} =$

(A) 1 (B) $\frac{7}{6}$ (C) $\frac{4}{3}$ (D) 2 (E) $\frac{13}{6}$



19. In the triangle above, the sum of the measures of the three marked angles is

(A) 540°
(B) 630°
(C) 720°
(D) 810°
(E) 900°

20. Which of the following is greater than 1 ?

(A) $\frac{0.00004}{0.005}$

(B) $\frac{0.000006}{0.0001}$

(C) $\frac{0.01}{0.003}$

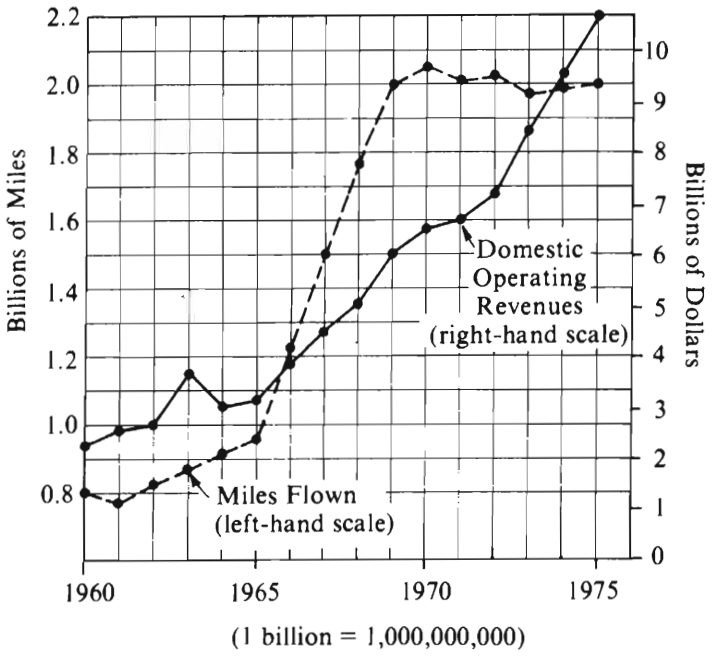
(D) $\frac{0.003}{0.006}$

(E) $\frac{0.001}{0.01}$

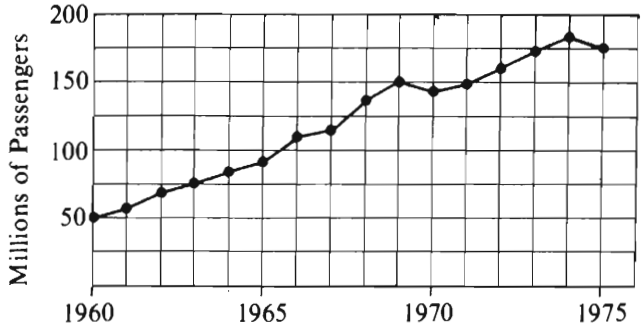
GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graphs.

DOMESTIC AIR CARRIERS: OPERATING REVENUES, MILES FLOWN, AND NUMBER OF PASSENGERS CARRIED, 1960 TO 1975



(1 billion = 1,000,000,000)



Note: Graphs drawn to scale.

21. In 1965 how many billions of miles were flown by domestic air carriers?

(A) 0.95 (B) 1.05 (C) 1.2
(D) 2.5 (E) 3.0

22. In which of the following years were there more passengers carried by domestic air carriers than in the year before and the year after?

(A) 1961
(B) 1965
(C) 1970
(D) 1972
(E) 1974

23. In 1969 what was the ratio of dollars of domestic operating revenues to miles flown?

(A) $\frac{4}{1}$ (B) $\frac{3}{1}$ (C) $\frac{3}{2}$ (D) $\frac{2}{3}$ (E) $\frac{1}{4}$

24. In billions of miles, approximately what was the average (arithmetic mean) number of miles flown per year by domestic air carriers from 1965 to 1970, inclusive?

(A) 1.0
(B) 1.5
(C) 2.0
(D) 4.5
(E) 6.0

25. From 1960 to 1975, what was the percent increase in the number of passengers carried by domestic air carriers?

(A) 125%
(B) 175%
(C) 250%
(D) 350%
(E) 450%

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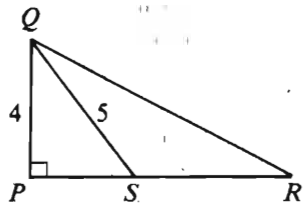
26. The average of two numbers is $2x$. If one of the numbers is y, the other number must be

(A) $x + y$
(B) $2x + y$
(C) $4x + y$
(D) $2x - y$
(E) $4x - y$



27. In the figure above, the area of triangular region PQR is 36. What is the area of triangular region SQR?

(A) 30 (B) 24 (C) 18 (D) 15 (E) 12

28. If the ratio of x to y is 9 times the ratio of y to x, then $\frac{x}{y}$ could be

(A) 9 (B) 3 (C) 1 (D) $\frac{1}{3}$ (E) $\frac{1}{9}$

29. Two microphones are located 100 meters apart and each is 130 meters from the same listening station. If a transmitter is located halfway between the two microphones, what is the distance, in meters, between the transmitter and the listening station?

(A) 120
(B) 124
(C) 125
(D) 128
(E) 130

30. A phone call from City X to City Y costs \$1.00 for the first 3 minutes and \$0.20 for each additional minute. If r is an integer greater than 3, a phone call r minutes long will cost how many dollars?

(A) $\frac{3r}{5}$

(B) $\frac{r - 10}{5}$

(C) $\frac{r - 3}{5}$

(D) $\frac{r + 2}{5}$

(E) $\frac{r + 15}{5}$

SECTION 5

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-3

Six employees—L, M, N, O, P, and R—are being assigned to offices, each of which can accommodate two persons and no more than two. Each person must be assigned to exactly one office and must be assigned to that office either alone or else together with one other member of the group of six. Enough offices are available to permit any possible assignment of group members to offices, but the following restrictions must be observed:

M cannot share an office with N.
N cannot share an office with O.
P and R must share an office together.

1. Which of the following pairs of employees can be assigned to one office together?

   (A) L and O
   (B) L and R
   (C) N and O
   (D) M and N
   (E) P and M

2. If N is assigned to an office alone, which of the following must be true?

   (A) No one other than N is assigned to an office alone.
   (B) L shares an office with O.
   (C) M is assigned to an office alone.
   (D) The group occupies either 4 or 5 offices.
   (E) The group occupies either 3 or 6 offices.

3. If P and R are the only ones who share an office, how many offices are the minimum that can accommodate the group?

   (A) 2 (B) 3 (C) 4 (D) 5 (E) 6

GO ON TO THE NEXT PAGE.

4. During the month of July in City X, the humidity was always 80 percent or higher whenever the temperature was 75° F or higher. Temperatures that month ranged from 65° to 95° F.

   If the statements in the passage above are true, which of the following CANNOT be an accurate report of a temperature and humidity reading for City X in July?

   (A) 77° F, 81%
   (B) 76° F, 80%
   (C) 75° F, 79%
   (D) 74° F, 78%
   (E) 73° F, 77%

5. Anyone who has owned a car knows that saving money in the short run by skimping on relatively minor repairs and routine maintenance will prove very costly in the long run. However, this basic truth is often forgotten by those who call for reduced government spending on social programs.

   Which of the following is NOT implied by the analogy above as a point of comparison?

   (A) Money that is spent on repairs and maintenance helps to ensure the continued functioning of a car.
   (B) Owners can take chances on not maintaining or repairing their cars.
   (C) In order to keep operating, cars will normally need some work.
   (D) The problems with a car will become worse if they are not attended to.
   (E) A car will last for only a limited period of time and then must be replaced.

6. If athletes want better performances, they should train at high altitudes. At higher altitudes, the body has more red blood cells per unit volume of blood than at sea level. The red blood cells transport oxygen, which will improve performance if available in greater amounts. The blood of an athlete who trains at high altitudes will transport more oxygen per unit volume of blood, improving the athlete's performance.

   Which of the following, if true, would be most damaging to the argument above, provided that the athlete's heart rate is the same at high and low altitudes?

   (A) Scientists have found that an athlete's heart requires a period of time to adjust to working at high altitudes.
   (B) Scientists have found that the body's total volume of blood declines by as much as 25 percent at high altitudes.
   (C) Middle-distance runners who train at high altitudes sometimes lose races to middle-distance runners who train at sea level.
   (D) The performances of athletes in competitions at all altitudes have improved markedly during the past twenty years.
   (E) At altitudes above 5,500 feet, middle-distance runners often better their sea-level running times by several seconds.

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Questions 7-13

When they hold a meeting, seven company executives—T, U, V, W, X, Y, and Z—sit at a rectangular table. Three executives sit along one side of the table, and three sit along the other side, each directly opposite one of the other three. The seventh sits at the head of the table; there is no seat at the foot of the table.

U always sits in one of the two seats farthest from the head of the table.
Y and V always sit next to each other.
V never sits next to Z.
If Z does not sit at the head of the table, W sits there.

7. Which of the following is an acceptable seating arrangement of the executives, starting with U, moving toward the head of the table, and continuing around the table?

(A) U, X, T, Z, V, Y, W
(B) U, T, X, Z, Y, V, W
(C) U, X, Z, Y, V, W, T
(D) U, Z, W, X, V, Y, T
(E) U, T, X, W, Z, V, Y

8. If W sits directly opposite T, X must sit next to which of the following executives?

(A) T (B) U (C) V (D) Y (E) Z

9. If T sits directly opposite Z and next to V, which executive must sit directly opposite U?

(A) V (B) W (C) X (D) Y (E) Z

10. If Z sits directly opposite X, which executive must sit next to U?

(A) T (B) V (C) W (D) Y (E) Z

11. If T and U sit immediately on either side of X, the executive sitting directly opposite X must be either

(A) W or V (B) W or Z (C) Y or V (D) Y or Z (E) Z or V

12. If W sits directly opposite U and next to T, the two executives sitting immediately on either side of X must be

(A) Y and V (B) Y and W (C) T and Z (D) T and V (E) Z and W

13. If Z sits at the head of the table, Y directly opposite U, and V immediately on X's left, what is the total number of possible seating arrangements of the executives?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

GO ON TO THE NEXT PAGE.

Questions 14-16

A weaver who is working on six rugs—G, H, I, J, K, and L—is preparing a work schedule for a work week consisting of five consecutive workdays—Monday through Friday. Rugs G, H, and I are of pattern 1, rugs J and K are of pattern 2, and rug L is of pattern 3. The work must be scheduled in accordance with the following conditions:

The weaver must work on each of the six rugs during the work week.
The weaver cannot work on the same rug on two consecutive days.
On any day that the weaver works on rug G, the weaver must work on rug J; the weaver cannot work on rug L that day.
On any day that the weaver works on more than one rug, those rugs must all be of different patterns.

14. The weaver could schedule work on which of the following rugs for the same day?

(A) G, J, and L
(B) G, I, and K
(C) G, J, and K
(D) H, I, and L
(E) H, J, and L

15. If the weaver's decision is to work on rug J on Tuesday, the weaver CANNOT work on rug

(A) G on Monday
(B) H on Tuesday
(C) I on Wednesday
(D) K on Thursday
(E) L on Friday

16. If the weaver's decision is to work on rug G on Monday and Friday only, and on rug K on Wednesday only, the weaver must work on a rug of pattern 2 on exactly how many workdays?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

GO ON TO THE NEXT PAGE.

Questions 17-22

Ruth, Sandra, Thea, and Ulla are the four finalists in a contest in which they perform set exercises on a balance beam. In each round of the contest, different exercises must be attempted. A contestant is eliminated the first time she fails at any of the exercises. To reduce any effect that the relative order of contestants within rounds may have on their performance, their relative order must be changed in going from one round to the next if it is possible to do so by executing one of the following three alternative reorderings between rounds:

X: Move the previously third contestant directly in front of the previously second contestant.
Y: Move the previously third contestant directly in front of the previously first contestant.
Z: Move the previously last contestant into first position.

If a contestant mentioned in a reordering has just been eliminated, that reordering cannot be executed.
If none of the reorderings can be executed, the remaining contestants must perform in the same order relative to each other as in the previous round.

17. If the order of contestants in one round is Ulla, Ruth, Sandra, Thea, and if Sandra is alone in being eliminated in that round, the order of contestants for the next round must be which of the following?

(A) Ruth, Thea, Ulla
(B) Ruth, Ulla, Thea
(C) Thea, Ruth, Ulla
(D) Thea, Ulla, Ruth
(E) Ulla, Ruth, Thea

18. If the order of contestants in one round is Sandra, Ruth, Thea, Ulla, and if none of the contestants is eliminated in that round, it must be true that in the next round

(A) Ruth is third
(B) Sandra is second
(C) Thea is first
(D) Ulla is first
(E) Ulla is fourth

19. The elimination of which of the following pairs of contestants in a round in which all four contestants competed would have the consequence that the relative position of the remaining contestants remains unchanged?

(A) Those competing first and second
(B) Those competing first and third
(C) Those competing second and third
(D) Those competing second and fourth
(E) Those competing third and fourth

20. If the order of contestants in a round in which no one fails is Ruth, Thea, Ulla, Sandra, the order of contestants in the next round could be which of the following?

(A) Ruth, Sandra, Ulla, Thea
(B) Sandra, Ruth, Ulla, Thea
(C) Sandra, Ulla, Ruth, Thea
(D) Thea, Ruth, Ulla, Sandra
(E) Ulla, Ruth, Thea, Sandra

21. If none of the four contestants is eliminated in the course of the first two rounds, and if the order of contestants in the third round is the same as it was in the first round, which of the following must have been the two reorderings executed so far?

(A) X, twice
(B) Z, twice
(C) X, followed by Y
(D) Y, followed by X
(E) Z, followed by Y

22. If the order of contestants in one round is Thea, Sandra, Ulla, Ruth, and if Sandra remains in second position afterward, which of the following could have happened?

(A) None of the contestants was eliminated in the round, and X was executed.
(B) Ruth alone was eliminated in the round, and X was executed.
(C) Thea alone was eliminated in the round, and Y was executed.
(D) Ulla alone was eliminated in the round, and Z was executed.
(E) Thea alone was eliminated in the round, and Z was executed.

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23. M is heavier than Q, but it is lighter than R.
S is heavier than Q and it is also heavier than R.
U is heavier than Q and it is also heavier than R.

If the statements above are true, one can conclude with certainty that T is heavier than M if one knows in addition that

(A) S weighs the same as U weighs
(B) S is heavier than T
(C) T is heavier than Q
(D) T is heavier than U
(E) U is heavier than M

24. The cost of the average computer logic device is falling at the rate of 25 percent per year, and the cost of the average computer memory device at the rate of 40 percent per year. It can be concluded that if these rates of cost decline remain constant for a period of three years, at the end of that time the cost of the average computer memory device will have declined by a greater amount than the cost of the average computer logic device.

Accurate information about which of the following would be most useful in evaluating the correctness of the conclusion above?

(A) The number of logic devices and memory devices projected to be purchased during the next three years
(B) The actual prices charged for the average computer logic device and the average computer memory device
(C) The compatibility of different manufacturers' logic devices and memory devices
(D) The relative durability of logic devices and memory devices
(E) The average number of logic devices and memory devices needed for an average computer system

25. Earthquakes, volcanic eruptions, and unusual weather have caused many more natural disasters adversely affecting people in the past decade than in previous decades. We can conclude that the planet Earth as a natural environment has become more inhospitable and dangerous, and we should employ the weather and earth sciences to look for causes of this trend.

The conclusion drawn above is most seriously weakened if which of the following is true?

(A) The weather and earth sciences have provided better early warning systems for natural disasters in the past decade than in previous decades.
(B) International relief efforts for victims of natural disasters have been better organized in the past decade than in previous decades.
(C) There are records of major earthquakes, volcanic eruptions, droughts, landslides, and floods occurring in the distant past, as well as in the recent past.
(D) Population pressures and poverty have forced increasing numbers of people to live in areas prone to natural disasters.
(E) There have been no changes in the past decade in people's land-use practices that could have affected the climate.

SECTION 6

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-5

Because of a computer malfunction, an accountant cannot directly determine the classification of certain accounts. Each account falls into one of five classifications: type 1, type 2, type 3, type 4, or type 5. The accountant hopes to be able to determine the classification of these accounts by tracing which operations the computer has performed on them. There are exactly four operations: W, X, Y, and Z. No operation can be performed more than once on a given account, and the operations were performed, without exception, according to the following rules:

If an account is a type 1, the computer performs either operation W or, alternatively, operation X.
If the account is a type 2, the computer performs either operation X alone or, alternatively, operation X and any one of the remaining operations except W.
If an account is a type 3, the computer performs either operation Y alone or, alternatively, operation Y and any one of the remaining operations.
If an account is a type 4, the computer performs exactly two operations in any combination except that X cannot be one of the two operations.
If an account is a type 5, the computer performs exactly three operations in any combination drawn from the four operations.

1. If the accountant knows that the computer has performed exactly one operation on an account, which of the following must be true?

(A) The account is either a type 1 or a type 2.
(B) The account is either a type 1, a type 2, or a type 3.
(C) The account is either a type 2, a type 3, or a type 5.
(D) The account is either a type 2, a type 4, or a type 5.
(E) The account is either a type 3, a type 4, or a type 5.

2. If the accountant knows that the computer has performed operation Z on an account but cannot determine solely from traces in the account whether any other operation has been performed, the account could be any one of the five types EXCEPT type

(A) 1
(B) 2
(C) 3
(D) 4
(E) 5

3. Which type of account, if operated on by the computer, must have operation X performed on it?

(A) Type 1
(B) Type 2
(C) Type 3
(D) Type 4
(E) Type 5

4. If the accountant knows that operations X and Z are the only operations that have been performed on an account, the account must be a type

(A) 1
(B) 2
(C) 3
(D) 4
(E) 5

5. If the accountant knows that the computer has performed exactly two operations on a given account, and operation Y was not one of the two, which of the following must be true?

(A) The account is either a type 1 or a type 2.
(B) The account is either a type 2 or a type 3.
(C) The account is either a type 2 or a type 4.
(D) The account is either a type 3 or a type 4.
(E) The account is either a type 3 or a type 5.

GO ON TO THE NEXT PAGE.

6. At the end of the Second World War the number of women in their childbearing years was at a record low. Yet for almost twenty years they produced a record high number of children. In 1957 there was an average of 3.72 children per family. Now the postwar babies are producing a record low number of babies. In 1983 the average number of children per family was about 1.79—two children fewer than the 1957 rate and lower even than the 2.11 rate that a population needs to replace itself.

   It can properly be inferred from the passage that

   (A) for the birth rate to be high, there must be a relatively large number of women in their childbearing years
   (B) the most significant factor influencing the birth rate is whether the country is engaged in a war
   (C) unless there are extraordinary circumstances, the birth rate will not dip below the level at which a population replaces itself
   (D) for the birth rate to be low, there must be a relatively small number of women in their childbearing years
   (E) the birth rate is not directly proportional to the number of women in their childbearing years

7. A study of illusionistic painting inevitably begins with the Greek painter Zeuxis. In an early work, which is the basis for his fame, he painted a bowl of grapes that was so lifelike that birds pecked at the fruit. In an attempt to expand his achievement to encompass human figures, he painted a boy carrying a bunch of grapes. When birds immediately came to peck at the fruit, Zeuxis judged that he had failed.

   Zeuxis' judgment that he had failed in his later work was based on an assumption. Which of the following can have served as that assumption?

   (A) People are more easily fooled by illusionistic techniques than are birds.
   (B) The use of illusionistic techniques in painting had become commonplace by the time Zeuxis completed his later work.
   (C) The grapes in the later painting were even more realistic than the ones in the earlier work.
   (D) Birds are less likely to peck at fruit when they see that a human being is present.
   (E) After the success of his early work, Zeuxis was unable to live up to the expectations of the general public.

* 8. The best argument for the tenure system that protects professional employment in universities is that it allows veteran faculty to hire people smarter than they are and yet remain secure in the knowledge that unless they themselves are caught in an act of moral turpitude—a concept that in the present climate almost defies definition—the younger faculty cannot turn around and fire them. This is not true in industry.

   Which of the following assumptions is most likely to have been made by the author of the argument above?

   (A) Industry should follow the example of universities and protect the jobs of managers by instituting a tenure system.
   (B) If no tenure system existed, veteran faculty would be reluctant to hire new faculty who might threaten the veteran faculty's own jobs.
   (C) The traditional argument that the tenure system protects scholars in universities from being dismissed for holding unconventional or unpopular beliefs is no longer persuasive.
   (D) If a stronger consensus concerning what constitutes moral turpitude existed, the tenure system in universities would be expendable.
   (E) Veteran faculty will usually hire and promote new faculty whose scholarship is more up-to-date than their own.

GO ON TO THE NEXT PAGE.

Questions 9-15

The appellate court of a state in the United States is staffed by exactly eight judges—R, S, T, U, V, W, X, and Y. At the beginning of each session of the court, the clerk of the court announces two panels of three judges each, one to hear criminal cases and one to hear civil cases.

No judge can serve on more than one panel at a session of the court.

At least two members of the panel hearing criminal cases must have had prior experience with criminal cases. The judges with experience in criminal cases, listed in order of descending seniority, are R, S, T, and U.

At least two members of the panel hearing civil cases must have had prior experience with civil cases. The judges with experience in civil cases, listed in order of descending seniority, are V, W, X, and Y.

The presiding judge of each panel is the judge among the three on the panel with the greatest seniority in the area of the cases.

Each of the three major geographical regions of the state must be represented on every panel by exactly one judge. Judges S and W are from the western part of the state; Judges R, U, and Y are from the central part of the state; and Judges T, V, and X are from the eastern part of the state.

If a judge cannot serve on a panel because of illness or conflict of interest, his or her place can be taken only by a judge who meets the necessary conditions for the panel.

9. Which of the following could be the panel of judges selected to hear civil cases?

(A) R, S, V
(B) S, U, X
(C) T, W, Y
(D) U, V, Y
(E) V, X, Y

10. If X is the presiding judge of the panel selected to hear civil cases, which of the following must be the other two members of that panel?

(A) R and W
(B) S and U
(C) S and Y
(D) T and Y
(E) U and V

11. Which of the following could be the panel of judges selected to hear criminal cases?

(A) R, S, X
(B) R, V, W
(C) S, T, W
(D) S, V, Y
(E) T, U, X

12. The judges selected to serve on any panel announced by the clerk of the court must include either

(A) R or U
(B) R or Y
(C) S or W
(D) T or V
(E) T or X

13. If the panel of judges hearing criminal cases consists of T, U, and W, and if U withdraws because of a conflict of interest and is replaced, which of the following judges will be the presiding judge of the panel hearing criminal cases after U has been replaced?

(A) R (B) S (C) T (D) W (E) Y

14. If V cannot serve on either panel and if the panel of judges hearing civil cases consists of U, W, and X, all of the following must be true EXCEPT:

(A) S is a member of the panel hearing criminal cases.
(B) T is a member of the panel hearing criminal cases.
(C) T is the presiding judge of the panel hearing criminal cases.
(D) W is the presiding judge of the panel hearing civil cases.
(E) Either R or Y, but not both, is a member of the panel hearing criminal cases.

15. If the panel of judges hearing criminal cases consists of T, U, and W, and if X is appointed as a replacement on the panel hearing civil cases, after that change which of the following judges will be the presiding judge of the panel hearing civil cases?

(A) S (B) V (C) W (D) X (E) Y

GO ON TO THE NEXT PAGE.

Questions 16-19

A cryptanalyst must translate into letters all of the digits included in the following two lines of nine symbols each:

9 3 3 4 5 6 6 6 7
2 2 3 3 4 4 5 7 8

The cryptanalyst has already determined some of the rules governing the decoding:

Each of the digits from 2 to 9 represents exactly one of the eight letters A, E, I, O, U, R, S, and T, and each letter is represented by exactly one of the digits.
If a digit occurs more than once, it represents the same letter on each occasion.
The letter T and the letter O are each represented exactly 3 times.
The letter I and the letter A are each represented exactly two times.
The letter E is represented exactly four times.

16. If 2 represents R and 7 represents A, then 5 must represent

(A) I (B) O (C) S (D) T (E) U

17. Which of the following is a possible decoding of the five-digit message 4 6 5 3 6?

(A) O–T–A–E–T
(B) O–T–E–U–T
(C) O–O–S–E–O
(D) T–O–I–E–T
(E) T–O–R–E–T

18. If 9 represents a vowel, it must represent which of the following?

(A) A (B) E (C) I (D) O (E) U

19. If 8 represents a vowel, which of the following must represent a consonant?

(A) 2 (B) 4 (C) 5 (D) 7 (E) 9

GO ON TO THE NEXT PAGE.

Questions 20-22

An instructor regularly offers a six-week survey course on film genres. Each time the course is given, she covers six of the following eight genres: adventure films, *cinéma noir*, detective films, fantasy films, horror films, musical comedies, silent films, and westerns. She will discuss exactly one genre per week according to the following conditions:

Silent films are always covered, and always in the first week.
Westerns and adventure films are always covered, with westerns covered in the week immediately preceding the week adventure films are covered.
Musical comedies are never covered in the same course in which fantasy films are covered.
If detective films are covered, they are covered after westerns are covered, with exactly one of the other genres covered between them.
Cinéma noir is not covered unless detective films are covered in one of the previous weeks.

20. Which of the following is an acceptable schedule of genres for weeks one through six of the course?

(A) Silent films, westerns, adventure films, detective films, horror films, musical comedies
(B) Silent films, westerns, adventure films, horror films, detective films, fantasy films
(C) Fantasy films, musical comedies, detective films, *cinéma noir*, westerns, adventure films
(D) Westerns, adventure films, detective films, *cinéma noir*, musical comedies, horror films
(E) Detective films, westerns, adventure films, horror films, fantasy films, *cinéma noir*

21. If musical comedies are covered the week immediately preceding the week westerns are covered, which of the following can be true?

(A) Adventure films are covered the second week.
(B) *Cinéma noir* is covered the fourth week.
(C) Detective films are covered the third week.
(D) Fantasy films are covered the fifth week.
(E) Horror films are covered the sixth week.

22. Which of the following will NEVER be covered in the sixth week of the course?

(A) *Cinéma noir* (B) Fantasy films
(C) Horror films (D) Musical comedies
(E) Westerns

23. The population of elephant seals, reduced by hunting to perhaps a few dozen animals early in this century, has soared under federal protection during the last few decades. However, because the species repopulated itself through extensive inbreeding, it now exhibits a genetic uniformity that is almost unparalleled in other species of mammals, and thus it is in far greater danger of becoming extinct than are most other species.

Given the information in the passage above, which of the following is most likely the reason that other species of mammals are less likely than elephant seals to become extinct?

(A) Other species of mammals have large populations, so the loss of a few members of the species is not significant.
(B) Other species of mammals have increased their knowledge of dangers through the experience of generation after generation of animals.
(C) In other species of mammals, hunters can readily distinguish between males and females or between young animals and adults.
(D) In other species of mammals, some members of the species are genetically better equipped to withstand a disease or event that destroys other members of the species.
(E) Other species of mammals have retained habits of caution and alertness because they have not been protected as endangered species.

GO ON TO THE NEXT PAGE.

24. Some people assert that prosecutors should be allowed to introduce illegally obtained evidence in criminal trials if the judge and jury can be persuaded that the arresting officer was not aware of violating or did not intend to violate the law while seizing the evidence. This proposed "good-faith exception" would weaken everyone's constitutional protection, lead to less careful police practices, and promote lying by law enforcement officers in court.

The argument above for maintaining the prohibition against illegally obtained evidence assumes that

(A) defendants in criminal cases should enjoy greater protection from the law than other citizens do
(B) law enforcement authorities need to be encouraged to pursue criminals assiduously
(C) the legal system will usually find ways to ensure that real crimes do not go unprosecuted
(D) the prohibition now deters some unlawful searches and seizures
(E) courts should consider the motives of law enforcement officers in deciding whether evidence brought forward by the officers is admissible in a trial

25. If it is true that the streets and the sidewalks are wet whenever it is raining, which of the following must also be true?

I. If the streets and sidewalks are wet, it is raining.
II. If the streets are wet but the sidewalks are not wet, it is not raining.
III. If it is not raining, the streets and sidewalks are not wet.

(A) I only
(B) II only
(C) III only
(D) I and II only
(E) II and III only

FOR GENERAL TEST 24 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 1			Section 2		
Number	Answer	P+	Number	Answer	P+
1	C	90	1	E	91
2	D	85	2	E	91
3	B	63	3	D	89
4	E	58	4	E	66
5	D	49	5	D	57
6	A	45	6	C	53
7	B	25	7	C	26
8	B	83	8	C	91
9	C	82	9	E	85
10	D	67	10	C	75
11	E	56	11	A	55
12	D	52	12	B	47
13	B	46	13	B	59
14	B	34	14	E	50
15	A	33	15	A	24
16	E	19	16	A	22
17	D	82	17	B	83
18	B	67	18	A	33
19	E	82	19	E	81
20	E	41	20	A	55
21	C	78	21	E	48
22	A	63	22	D	53
23	D	73	23	B	74
24	A	29	24	D	45
25	E	40	25	A	36
26	D	52	26	E	46
27	B	50	27	B	49
28	D	87	28	A	91
29	C	85	29	B	78
30	E	77	30	D	73
31	D	70	31	A	75
32	D	54	32	C	67
33	E	58	33	D	53
34	A	44	34	E	47
35	D	32	35	C	45
36	E	43	36	C	37
37	A	25	37	E	18
38	C	17	38	E	16

QUANTITATIVE ABILITY					
Section 3			Section 4		
Number	Answer	P+	Number	Answer	P+
1	A	95	1	D	83
2	C	87	2	B	86
3	A	89	3	D	93
4	B	90	4	C	83
5	D	85	5	A	80
6	B	92	6	A	82
7	A	71	7	D	76
8	B	76	8	B	73
9	A	64	9	A	62
10	C	63	10	B	66
11	D	57	11	C	54
12	A	65	12	A	47
13	C	49	13	D	52
14	B	41	14	A	33
15	D	49	15	C	23
16	E	88	16	D	93
17	C	79	17	A	87
18	A	82	18	E	89
19	C	77	19	E	63
20	E	73	20	C	79
21	D	86	21	A	87
22	C	81	22	E	76
23	C	48	23	B	52
24	A	29	24	B	73
25	E	37	25	C	43
26	B	64	26	E	52
27	E	54	27	A	42
28	D	51	28	B	36
29	B	40	29	A	48
30	D	18	30	D	37

ANALYTICAL ABILITY					
Section 5			Section 6		
Number	Answer	P+	Number	Answer	P+
1	A	94	1	B	74
2	D	76	2	A	79
3	D	68	3	B	86
4	C	90	4	B	82
5	E	72	5	C	60
6	B	72	6	E	84
7	B	76	7	D	75
8	B	58	8	B	69
9	D	60	9	C	61
10	A	68	10	C	59
11	C	68	11	A	76
12	C	65	12	C	59
13	B	56	13	A	61
14	E	55	14	C	50
15	A	57	15	D	31
16	C	54	16	A	66
17	D	48	17	A	49
18	A	34	18	E	67
19	E	34	19	E	40
20	E	42	20	A	54
21	A	32	21	E	37
22	E	20	22	E	50
23	D	49	23	D	57
24	B	55	24	D	43
25	D	33	25	B	43

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 24 ONLY AND THE PERCENTS BELOW*

Raw Score	Scaled Scores and Percents Below						Raw Score	Scaled Scores and Percents Below					
	Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below		Verbal Score	% Below	Quantitative Score	% Below	Analytical Score	% Below
74-76	800	99					40	440	40	560	52	650	84
73	790	99					39	430	37	540	46	640	81
72	780	99					38	420	34	530	44	630	78
71	770	99					37	410	31	520	42	620	77
70	760	99					36	410	31	510	39	600	72
69	740	98					35	400	28	500	37	590	69
68	730	97					34	390	26	480	32	580	67
67	720	96					33	380	24	470	30	570	64
66	710	96					32	370	22	460	27	560	61
65	700	95					31	360	18	450	26	540	56
64	680	93					30	360	18	430	21	530	53
63	670	92					29	350	17	420	19	520	50
62	660	91					28	340	15	410	18	510	46
61	650	89					27	330	13	400	16	490	41
60	640	88	800	98			26	330	13	390	14	480	38
59	630	86	790	98			25	320	11	370	11	470	36
58	620	85	780	97			24	310	10	360	10	450	30
57	610	84	760	94			23	300	8	350	9	440	27
56	590	80	750	92			22	290	7	340	8	430	25
55	580	78	740	90			21	280	6	320	6	410	21
54	570	75	730	89			20	270	4	310	5	400	18
53	560	73	720	87			19	260	3	300	4	390	16
52	550	71	700	83			18	250	3	290	3	380	15
51	540	68	690	81			17	240	2	280	3	360	11
50	530	65	680	79	800	99	16	230	1	260	2	350	10
49	520	63	670	77	800	99	15	220	1	250	1	330	7
48	510	60	650	72	780	98	14	210	1	240	1	310	5
47	510	60	640	71	760	97	13	200	0	230	1	300	4
46	500	57	630	68	740	95	12	200	0	210	0	280	3
45	480	52	620	65	720	93	11	200	0	200	0	260	2
44	470	49	610	63	710	92	10	200	0	200	0	240	1
43	470	49	590	59	690	89	9	200	0	200	0	230	1
42	460	45	580	56	680	88	8	200	0	200	0	210	0
41	450	43	570	53	670	86	0-7	200	0	200	0	200	0

*Percent scoring below the scaled score, based on the performance of the 816,621 examinees who took the General Test between October 1, 1983, and September 30, 1986.

TEST 25

SECTION 1

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

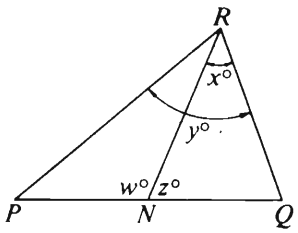
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

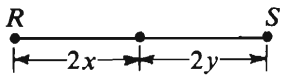


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

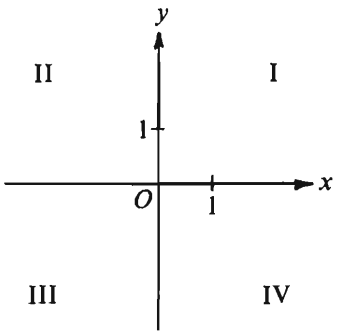
	Column A	Column B
	$S = 6 + 7 + 8 + 9$ $T = 9 + 8 + 7 + 6$	
1.	$S + T$	$4(15)$
2.	$\frac{332}{999}$	$\frac{1}{3}$
	Each of w and x is less than 5 and greater than 2. Each of y and z is less than 2 and greater than 1.	
3.	$w + x$	$y + z$



$x + y = 7$

4.	The length of segment RS	14
	$2x + y = 6$ $y = x$	
5.	$x + y$	$3x - 2$

	Column A	Column B
	Coins are put into 5 pockets so that each pocket contains at least one coin, but no two pockets contain the same number of coins.	
6.	The least possible total number of coins in the 5 pockets	16



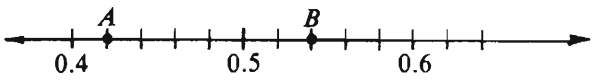
Points $(x, 3)$ and $(3, y)$ are in quadrants II and IV, respectively.

7.	x	y
	$n > 0$	
8.	$\frac{10^n}{10^{n+1}}$	$\frac{10^{n+1}}{10^{n+2}}$

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

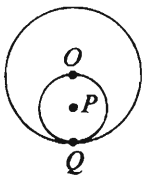
Column A	Column B



Note: Drawn to scale.

A and B are points on the number line.

9.	The length of segment AB	0.11



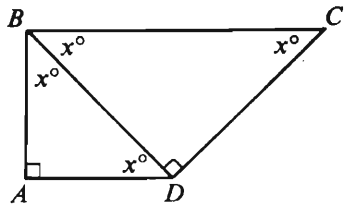
The circle with center O and the circle with center P are tangent at Q.

10.	The area of the circular region with center O	Four times the area of the circular region with center P

Brand R coffee costs \$3.25 per pound and brand T coffee costs \$2.50 per pound.

11.	The number of pounds of brand R in a mixture of brands R and T that costs \$3.00 per pound	1.2

Column A	Column B

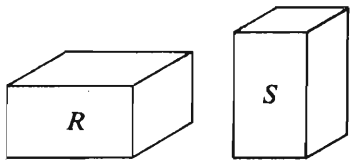


$AB = 1$

12.	The perimeter of quadrilateral $ABCD$	6
13.	The value of the units' digit in 6^{47}	The value of the units' digit in 5^{77}

For all numbers r and s, where $s \neq 0$, $r \circledast s = \frac{10r}{s}$.

14.	$(0.01) \circledast (0.01)$	1



The volume of block R is equal to the volume of block S.

15.	The total surface area of R	The total surface area of S

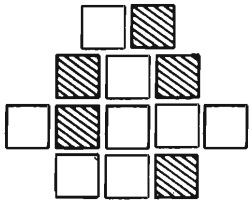
GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

---

16. A certain photocopying machine can make 10 copies every 4 seconds. At this rate, how many copies can the machine make in 6 minutes?

(A) 900
(B) 600
(C) 360
(D) 240
(E) 150



17. The figure above is made up of shaded and unshaded squares of the same size. What is the ratio of the number of shaded squares to the total number of shaded and unshaded squares?

(A) $\frac{13}{5}$ (B) $\frac{8}{5}$ (C) $\frac{5}{8}$ (D) $\frac{1}{2}$ (E) $\frac{5}{13}$

18. If $a = 2$, $b = 4$, and $c = 5$, then $\frac{a+b}{c} - \frac{c}{a+b} =$

(A) 1
(B) $\frac{11}{30}$
(C) 0
(D) $-\frac{11}{30}$
(E) -1

19. In the xy-plane, which of the following points is the greatest distance from the origin?

(A) (0, 3)
(B) (1, 3)
(C) (2, 1)
(D) (2, 3)
(E) (3, 0)

20. If $\frac{y}{x} = -1$, then $y + x =$

(A) -2 (B) -1 (C) 0 (D) 1 (E) 2

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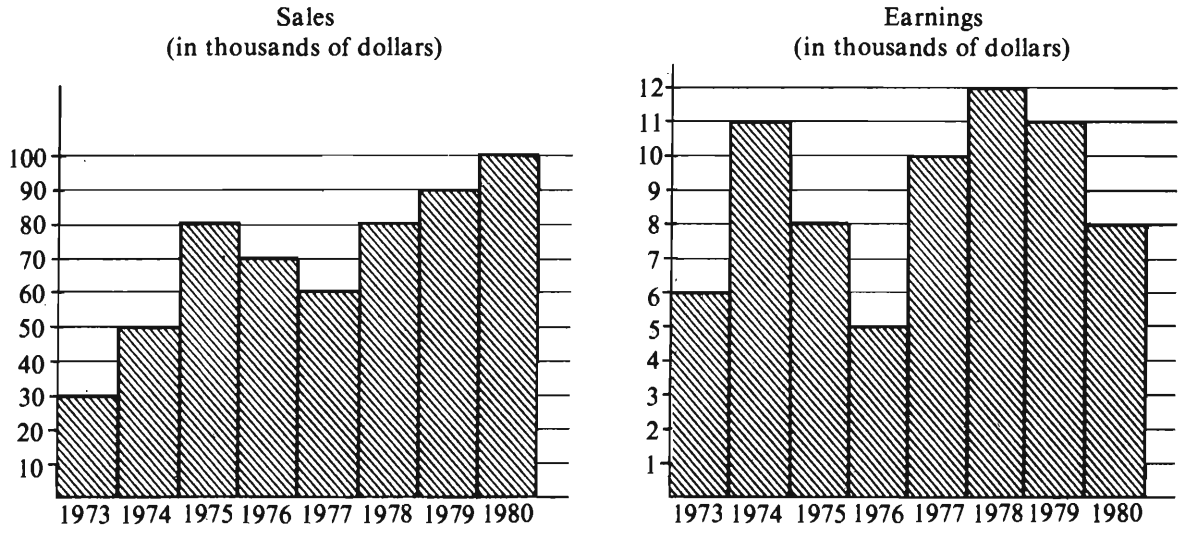
Questions 21-25 refer to the following graphs.

SALES AND EARNINGS OF COMPANY *X*



Note: Drawn to scale.

21. For the years 1974 to 1979 inclusive, what was the amount of the greatest increase in sales from one year to the next?

(A) $5,000 (B) $10,000 (C) $12,000
(D) $30,000 (E) $80,000

22. For the period from 1973 to 1977 inclusive, what were the average (arithmetic mean) sales per year?

(A) $57,000
(B) $58,000
(C) $59,500
(D) $60,300
(E) $61,700

23. In which of the years from 1974 to 1979 inclusive, did earnings change by the greatest percent over the previous year?

(A) 1974 (B) 1975 (C) 1977
(D) 1978 (E) 1979

24. If at the end of 1973 Company *X* sold 30,000 shares of common stock for 35 times Company *X*'s earnings for the year, what was the price of a share of common stock at that time?

(A) $7.00
(B) $10.00
(C) $17.50
(D) $35.00
(E) $70.00

25. If Company *X* considered a good year to be any year in which earnings were at least 20 percent of sales, how many of the years shown were good years?

(A) None (B) One (C) Two
(D) Three (E) Four

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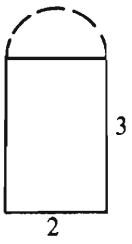


26. A rectangular window with dimensions 2 meters by 3 meters is to be enlarged by cutting out a semicircular region in the wall as shown above. What is the area, in square meters, of this semicircular region?

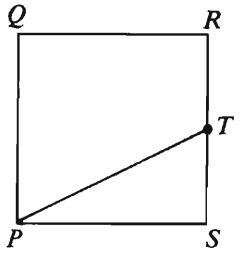
(A) $\frac{\pi}{4}$ (B) $\frac{\pi}{2}$ (C) π (D) 2π (E) 4π

27. $\frac{10^2(10^8 + 10^8)}{10^4} =$

(A) $2(10^4)$ (B) $2(10^6)$ (C) 10^8
(D) $2(10^8)$ (E) 10^{10}

28. Worker W produces n units in 5 hours. Workers V and W, working independently but at the same time, produce n units in 2 hours. How long would it take V alone to produce n units?

(A) 1 hr 26 min
(B) 1 hr 53 min
(C) 2 hr 30 min
(D) 3 hr 20 min
(E) 3 hr 30 min



29. In square $PQRS$ above, T is the midpoint of side RS. If $PT = 8\sqrt{5}$, what is the length of a side of the square?

(A) 16 (B) $6\sqrt{5}$ (C) $4\sqrt{5}$
(D) 8 (E) $2\sqrt{6}$

30. If $q \neq 0$ and $k = \frac{qr}{2} - s$, then what is r in terms of k, q, and s?

(A) $\frac{2k + s}{q}$

(B) $\frac{2sk}{q}$

(C) $\frac{2(k - s)}{q}$

(D) $\frac{2k + sq}{q}$

(E) $\frac{2(k + s)}{q}$

SECTION 2

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Hydrogen is the ------- element of the universe in that it provides the building blocks from which the other elements are produced.

   (A) steadiest (B) expendable (C) lightest (D) final (E) fundamental

2. Few of us take the pains to study our cherished convictions; indeed, we almost have a natural ------- doing so.

   (A) aptitude for (B) repugnance to (C) interest in (D) ignorance of (E) reaction after

3. It is his dubious distinction to have proved what nobody would think of denying, that Romero at the age of sixty-four writes with all the characteristics of -------

   (A) maturity (B) fiction (C) inventiveness (D) art (E) brilliance

4. The primary criterion for ------- a school is its recent performance: critics are ------- to extend credit for earlier victories.

   (A) evaluating..prone
   (B) investigating..hesitant
   (C) judging..reluctant
   (D) improving..eager
   (E) administering..persuaded

5. Number theory is rich in problems of an especially ------- sort: they are tantalizingly simple to state but ------- difficult to solve.

   (A) cryptic..deceptively
   (B) spurious..equally
   (C) abstruse..ostensibly
   (D) elegant..rarely
   (E) vexing..notoriously

6. In failing to see that the justice's pronouncement merely ------- previous decisions rather than actually establishing a precedent, the novice law clerk ------- the scope of the justice's judgment.

   (A) synthesized..limited
   (B) overturned..misunderstood
   (C) endorsed..nullified
   (D) qualified..overemphasized
   (E) recapitulated..defined

7. When theories formerly considered to be ------- in their scientific objectivity are found instead to reflect a consistent observational and evaluative bias, then the presumed neutrality of science gives way to the recognition that categories of knowledge are human -------.

   (A) disinterested..constructions
   (B) callous..errors
   (C) verifiable..prejudices
   (D) convincing..imperatives
   (E) unassailable..fantasies

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. CHOIR:SINGER ::
   (A) election:voter
   (B) anthology:poet
   (C) cast:actor
   (D) orchestra:composer
   (E) convention:speaker

9. GLARING:BRIGHT ::
   (A) iridescent:colorful
   (B) perceptible:visible
   (C) discordant:harmonious
   (D) peppery:salty
   (E) deafening:loud

10. MAVERICK:CONFORMITY ::
   (A) renegade:ambition
   (B) extrovert:reserve
   (C) reprobate:humility
   (D) zealot:loyalty
   (E) strategist:decisiveness

11. SLITHER:SNAKE :: (A) perch:eagle (B) bask:lizard (C) waddle:duck (D) circle:hawk (E) croak:frog

12. COUNTENANCE:TOLERATION ::
   (A) defer:ignorance (B) renounce:mistrust (C) encroach:jealousy (D) demur:objection (E) reject:disappointment

13. PROCTOR:SUPERVISE ::
   (A) prophet:rule
   (B) profiteer:consume
   (C) profligate:demand
   (D) prodigal:squander
   (E) prodigy:wonder

14. REDOLENT:SMELL ::
   (A) curious:knowledge
   (B) lucid:sight
   (C) torpid:motion
   (D) ephemeral:touch
   (E) piquant:taste

*15. TORQUE:ROTATION ::
   (A) centrifuge:axis
   (B) osmosis:membrane
   (C) tension:elongation
   (D) elasticity:variation
   (E) gas:propulsion

16. SUBSIDY:SUPPORT ::
   (A) assistance:endowment
   (B) funds:fellowship
   (C) credit:payment
   (D) debt:obligation
   (E) loan:note

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

* By the time the American colonists took up arms against Great Britain in order to secure their independence, the institution of Black slavery was deeply entrenched. But the contradiction inherent in this situation was, for many, a source of constant embarrassment. "It always appeared a most iniquitous scheme to me," Abigail Adams wrote her husband in 1774, "to fight ourselves for what we are daily robbing and plundering from those who have as good a right to freedom as we have."

Many Americans besides Abigail Adams were struck by the inconsistency of their stand during the War of Independence, and they were not averse to making moves to emancipate the slaves. Quakers and other religious groups organized antislavery societies, while numerous individuals manumitted their slaves. In fact, within several years of the end of the War of Independence, most of the Eastern states had made provisions for the gradual emancipation of slaves.

* 17. Which of the following best states the central idea of the passage?

(A) The War of Independence produced among many Black Americans a heightened consciousness of the inequities in American society.
(B) The War of Independence strengthened the bonds of slavery of many Black Americans while intensifying their desire to be free.
(C) The War of Independence exposed to many Americans the contradiction of slavery in a country seeking its freedom and resulted in efforts to resolve that contradiction.
(D) The War of Independence provoked strong criticisms by many Americans of the institution of slavery, but produced little substantive action against it.
(E) The War of Independence renewed the efforts of many American groups toward achieving Black emancipation.

18. The passage contains information that would support which of the following statements about the colonies before the War of Independence?

(A) They contained organized antislavery societies.
(B) They allowed individuals to own slaves.
(C) They prohibited religious groups from political action.
(D) They were inconsistent in their legal definitions of slave status.
(E) They encouraged abolitionist societies to expand their influence.

* 19. According to the passage, the War of Independence was embarrassing to some Americans for which of the following reasons?

I. It involved a struggle for many of the same liberties that Americans were denying to others.
II. It involved a struggle for independence from the very nation that had founded the colonies.
III. It involved a struggle based on inconsistencies in the participants' conceptions of freedom.

(A) I only
(B) II only
(C) I and II only
(D) I and III only
(E) I, II, and III

* 20. Which of the following statements regarding American society in the years immediately following the War of Independence is best supported by the passage?

(A) The unexpected successes of the antislavery societies led to their gradual demise in the Eastern states.
(B) Some of the newly independent American states had begun to make progress toward abolishing slavery.
(C) Americans like Abigail Adams became disillusioned with the slow progress of emancipation and gradually abandoned the cause.
(D) Emancipated slaves gradually were accepted in the Eastern states as equal members of American society.
(E) The abolition of slavery in many Eastern states was the result of close cooperation between religious groups and free Blacks.

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The evolution of sex ratios has produced, in most plants and animals with separate sexes, approximately equal numbers of males and females. Why should this be so? Two main kinds of answers have been offered. One is couched in terms of advantage to population. It is argued that the sex ratio will evolve so as to maximize the number of meetings between individuals of the opposite sex. This is essentially a "group selection" argument. The other, and in my view correct, type of answer was first put forward by Fisher in 1930. This "genetic" argument starts from the assumption that genes can influence the relative numbers of male and female offspring produced by an individual carrying the genes. That sex ratio will be favored which maximizes the number of descendants an individual will have and hence the number of gene copies transmitted. Suppose that the population consisted mostly of females: then an individual who produced sons only would have more grandchildren. In contrast, if the population consisted mostly of males, it would pay to have daughters. If, however, the population consisted of equal numbers of males and females, sons and daughters would be equally valuable. Thus a one-to-one sex ratio is the only stable ratio; it is an "evolutionarily stable strategy." Although Fisher wrote before the mathematical theory of games had been developed, his theory incorporates the essential feature of a game—that the best strategy to adopt depends on what others are doing.

Since Fisher's time, it has been realized that genes can sometimes influence the chromosome or gamete in which they find themselves so that the gamete will be more likely to participate in fertilization. If such a gene occurs on a sex-determining (X or Y) chromosome, then highly aberrant sex ratios can occur. But more immediately relevant to game theory are the sex ratios in certain parasitic wasp species that have a large excess of females. In these species, fertilized eggs develop into females and unfertilized eggs into males. A female stores sperm and can determine the sex of each egg she lays by fertilizing it or leaving it unfertilized. By Fisher's argument, it should still pay a female to produce equal numbers of sons and daughters. Hamilton, noting that the eggs develop within their host—the larva of another insect—and that the newly emerged adult wasps mate immediately and disperse, offered a remarkably cogent analysis. Since only one female usually lays eggs in a given larva, it would pay her to produce one male only, because this one male could fertilize all his sisters on emergence. Like Fisher, Hamilton looked for an evolutionarily stable strategy, but he went a step further in *recognizing* that he was looking for a strategy.

21. The author suggests that the work of Fisher and Hamilton was similar in that both scientists
    (A) conducted their research at approximately the same time
    (B) sought to manipulate the sex ratios of some of the animals they studied
    (C) sought an explanation of why certain sex ratios exist and remain stable
    (D) studied game theory, thereby providing important groundwork for the later development of strategy theory
    (E) studied reproduction in the same animal species

22. It can be inferred from the passage that the author considers Fisher's work to be
    (A) fallacious and unprofessional
    (B) definitive and thorough
    (C) inaccurate but popular, compared with Hamilton's work
    (D) admirable, but not as up-to-date as Hamilton's work
    (E) accurate, but trivial compared with Hamilton's work

23. The passage contains information that would answer which of the following questions about wasps?
    I. How many eggs does the female wasp usually lay in a single host larva?
    II. Can some species of wasp determine sex ratios among their offspring?
    III. What is the approximate sex ratio among the offspring of parasitic wasps?
    (A) I only (B) II only (C) III only
    (D) I and II only (E) II and III only

24. It can be inferred that the author discusses the genetic theory in greater detail than the group selection theory primarily because he believes that the genetic theory is more
    (A) complicated (B) accurate (C) popular
    (D) comprehensive (E) accessible

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25. According to the passage, successful game strategy depends on

(A) the ability to adjust one's behavior in light of the behavior of others
(B) one's awareness that there is safety in numbers
(C) the degree of stability one can create in one's immediate environment
(D) the accuracy with which one can predict future events
(E) the success one achieves in conserving and storing one's resources

26. It can be inferred from the passage that the mathematical theory of games has been

(A) developed by scientists with an interest in genetics
(B) adopted by Hamilton in his research
(C) helpful in explaining how genes can sometimes influence gametes
(D) based on animal studies conducted prior to 1930
(E) useful in explaining some biological phenomena

27. Which of the following is NOT true of the species of parasitic wasps discussed in the passage?

(A) Adult female wasps are capable of storing sperm.
(B) Female wasps lay their eggs in the larvae of other insects.
(C) The adult female wasp can be fertilized by a male that was hatched in the same larva as herself.
(D) So few male wasps are produced that extinction is almost certain.
(E) Male wasps do not emerge from their hosts until they reach sexual maturity.

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. COMMOTION: (A) desirability (B) likability (C) propensity (D) changeability (E) tranquillity

29. INDETERMINATE: (A) qualified (B) definite (C) stubborn (D) effective (E) committed

30. DIVERGE: (A) relay (B) bypass (C) enclose (D) work quickly (E) come together

31. FLIPPANT: (A) evenly distributed (B) well coordinated (C) inflexible (D) sane (E) earnest

32. NEXUS: (A) disconnected components (B) tangled threads (C) lost direction (D) unseen obstacle (E) damaged parts

33. LEVY: (A) reconsider (B) relinquish (C) repatriate (D) revitalize (E) rescind

34. ANOMALOUS: (A) porous (B) viscous (C) essential (D) normal (E) elemental

35. GROUSE: (A) rejoice (B) rekindle (C) restore (D) reject (E) reflect

36. GIST:
(A) tangential point
(B) tentative explanation
(C) faulty assumption
(D) flawed argument
(E) meaningless distinction

37. EFFRONTERY: (A) decorum (B) candor (C) resolution (D) perplexity (E) mediation

38. LIMPID: (A) rampant (B) vapid (C) turbid (D) rigid (E) resilient

SECTION 3
Time—30 minutes
25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-7

A certain code uses only the letters K, L, M, N, and O. Words in the code are written from left to right. Code words are only those words that conform to the following conditions:

The minimum length for code words is two letters, not necessarily different from each other.
K cannot be the first letter in a word.
L must occur more than once in a word, if it occurs at all.
M cannot be the last letter in a word, nor the next-to-the-last letter.
N must occur in a word if K occurs in the word.
O cannot be the last letter in a word unless L occurs in the word.

1. Which of the following letters could be placed after O in L O to form a code word exactly three letters long?

(A) K (B) L (C) M (D) N (E) O

2. If the only kinds of letters that are available are K, L, and M, then the total number of different code words, each exactly two letters long, that it is possible to make is

(A) 1
(B) 3
(C) 6
(D) 9
(E) 12

3. Which of the following is a code word?

(A) K L L N
(B) L O M L
(C) M L L O
(D) N M K O
(E) O N K M

4. What is the total number of different code words exactly three identical letters long that it is possible to make?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

5. The code word M M L L O K N can be turned into another code word by carrying out any one of the following changes EXCEPT

(A) replacing every L with an N
(B) replacing the first M with an O
(C) replacing the N with an O
(D) moving the O to the immediate right of the N
(E) moving the second L to the immediate left of the K

6. Which of the following is not a code word but could be turned into one by changing the order of the letters within the word?

(A) K L M N O
(B) L L L K N
(C) M K N O N
(D) N K L M L
(E) O M M L L

7. Which of the following could be turned into a code word by replacing the "X" with a letter used in the code?

(A) M K X N O
(B) M X K M N
(C) X M M K O
(D) X M O L K
(E) X O K L L

GO ON TO THE NEXT PAGE.

Questions 8-9

"On the whole," Ms. Dennis remarked, "engineering students are lazier now than they used to be. I know because fewer and fewer of my students regularly do the work they are assigned."

8. The conclusion drawn above depends on which of the following assumptions?
   (A) Engineering students are working less because, in a booming market, they are spending more and more time investigating different job opportunities.
   (B) Whether or not students do the work they are assigned is a good indication of how lazy they are.
   (C) Engineering students should work harder than students in less demanding fields.
   (D) Ms. Dennis' students are doing less work because Ms. Dennis is not as effective a teacher as she once was.
   (E) Laziness is something most people do not outgrow.

9. Which of the following identifies a flaw in Ms. Dennis' reasoning?
   (A) Plenty of people besides engineering students do not work as hard as they should.
   (B) Ms. Dennis does not consider the excuses her students may have for being lazy.
   (C) The argument does not propose any constructive solutions to the problem it identifies.
   (D) The argument assumes that Ms. Dennis' students are representative of engineering students in general.
   (E) Ms. Dennis does not seem sympathetic to the problems of her students.

10. Popular culture in the United States has become Europeanized to an extent unimaginable twenty-five years ago. Not many people then drank wine with meals, and no one drank imported mineral water. No idea would have been more astonishing than that Americans would pay to watch soccer games. Such thoughts arise because of a report that the American Association of State Highway and Transportation Officials has just adopted a proposal to develop the country's first comprehensive interstate system of routes for bicycles.

    Which of the following inferences is best supported by the passage?
    (A) Long-distance bicycle routes are used in Europe.
    (B) Drinking imported mineral water is a greater luxury than drinking imported wine.
    (C) United States culture has benefited from exposure to foreign ideas.
    (D) Most Europeans make regular use of bicycles.
    (E) The influence of the United States on European culture has assumed unprecedented proportions in the last twenty-five years.

GO ON TO THE NEXT PAGE.

Questions 11-16

Six knights—P, Q, R, S, T, and U—assemble for a long journey in two traveling parties. For security, each traveling party consists of at least two knights. The two parties travel by separate routes, northern and southern. After one month, the routes of the northern and southern groups converge for a brief time and at that point the knights can, if they wish, rearrange their traveling parties before continuing, again in two parties along separate northern and southern routes. Throughout the entire trip, the composition of traveling parties must be in accord with the following conditions:

P and R are deadly enemies and, although they may meet briefly, can never travel together.
P must travel in the same party with S.
Q cannot travel by the southern route.
U cannot change routes.

11. If one of the two parties of knights consists of P and U and two other knights and travels by the southern route, the other members of this party besides P and U must be

(A) Q and S
(B) Q and T
(C) R and S
(D) R and T
(E) S and T

12. If each of the two parties of knights consists of exactly three members, which of the following is NOT a possible traveling party and route?

(A) P, S, Q by the northern route
(B) P, S, T by the northern route
(C) P, S, T by the southern route
(D) P, S, U by the southern route
(E) Q, R, T by the northern route

13. If one of the two parties of knights consists of U and two other knights and travels by the northern route, the other members of this party besides U must be

(A) P and S
(B) P and T
(C) Q and R
(D) Q and T
(E) R and T

14. If each of the two parties of knights consists of exactly three members, S and U are members of different parties, and R travels by the northern route, then T must travel by the

(A) southern route with P and S
(B) southern route with Q and R
(C) southern route with R and U
(D) northern route with Q and R
(E) northern route with R and U

15. If, when the two parties of knights encounter one another after a month, exactly one knight changes from one traveling party to the other traveling party, that knight must be

(A) P (B) Q (C) R (D) S (E) T

16. If one of the changes after a month's traveling is that T changes from a party of two knights traveling by the southern route to a party of four knights traveling by the northern route, then all of the following must be true EXCEPT:

(A) During the first month, U was traveling by the southern route.
(B) During the first month, P was traveling by the northern route.
(C) During the first month, R was traveling with T.
(D) After the first month, R travels with T.
(E) After the first month, S travels by the southern route.

GO ON TO THE NEXT PAGE.

Questions 17-19

A particular auto race involved eight cars—S, T, U, V, W, X, Y, and Z. At the end of every lap, an accurate record was made of the position of the cars, from first (position 1) to last (position 8). For each of the records the following statements are true:

No two cars occupy the same position.
S is in some position ahead of Z.
There is exactly one car between T and X, regardless of whether T or X is ahead of the other.
U is in the position immediately ahead of Y.
Both V and Y are in positions ahead of S.
W is in first position.

17. Which of the following could be noted on one of the records as the positions of the cars from position 1 through position 8 ?

(A) W, U, S, Y, V, T, Z, X
(B) W, U, Y, S, T, V, Z, X
(C) W, U, Y, V, S, T, Z, X
(D) W, U, Y, Z, V, T, S, X
(E) W, V, S, U, Y, T, Z, X

18. If on one of the records Y and X are in positions 4 and 5, respectively, which of the following must be true of that record?

(A) S is in position 2.
(B) S is in position 7.
(C) T is in position 3.
(D) V is in position 3.
(E) Z is in position 8.

19. If on one of the records V is in some position behind T, which car must be in position 7 on that record?

(A) S (B) T (C) V (D) X (E) Z

GO ON TO THE NEXT PAGE.

Questions 20-22

An airline company is offering a particular group of people two package tours involving eight European cities—London, Madrid, Naples, Oslo, Paris, Rome, Stockholm, and Trieste. While half the group goes on tour number one to visit five of the cities, the other half will go on tour number two to visit the other three cities. The group must select the cities to be included in each tour. The selection must conform to the following restrictions:

Madrid cannot be in the same tour as Oslo.
Naples must be in the same tour as Rome.
If tour number one includes Paris, it must also include London.
If tour number two includes Stockholm, it cannot include Madrid.

20. If tour number two includes Rome, which of the following CANNOT be true?

(A) London is in tour number one.
(B) Oslo is in tour number one.
(C) Trieste is in tour number one.
(D) Madrid is in tour number two.
(E) Stockholm is in tour number two.

21. If tour number two includes Paris, which of the following must be true?

(A) London is in tour number one.
(B) Naples is in tour number one.
(C) London is in tour number two.
(D) Oslo is in tour number two.
(E) Trieste is in tour number two.

22. If tour number one includes Paris and tour number two includes Madrid, which of the following must also be included in tour number two?

(A) London
(B) Oslo
(C) Rome
(D) Stockholm
(E) Trieste

GO ON TO THE NEXT PAGE.

23. In the 1980 United States census, marital status was described under one of five categories: single, now married (but not separated), separated, divorced, widowed. In the category "separated," including both those who were legally separated and those who were estranged and living apart from their spouses, one million more women than men were counted.

Which of the following, if true, provide(s) or contribute(s) to an explanation for this result?

I. There are more women of marriageable age than men of marriageable age in the United States.
II. More of the separated men than separated women in the United States could not be found by the census takers during the census.
III. Many more separated men than separated women left the United States for residence in another country.

(A) I only
(B) II only
(C) III only
(D) I and II only
(E) II and III only

24. In recent years shrimp harvests of commercial fishermen in the South Atlantic have declined dramatically in total weight. The decline is due primarily to competition from a growing number of recreational fishermen, who are able to net young shrimp in the estuaries where they mature.

Which of the following regulatory actions would be most likely to help increase the shrimp harvests of commercial fishermen?

(A) Requiring commercial fishermen to fish in estuaries
(B) Limiting the total number of excursions per season for commercial fishermen
(C) Requiring recreational fishermen to use large-mesh nets in their fishing
(D) Putting an upper limit on the size of the shrimp recreational fishermen are allowed to catch
(E) Allowing recreational fishermen to move out of estuaries into the South Atlantic

25. The 38 corporations that filed United States income tax returns showing a net income of more than $100 million accounted for 53 percent of the total taxable income from foreign sources reported on all tax returns. Sixty percent of the total taxable income from foreign sources came from the 200 returns reporting income from 10 or more countries.

If the statements above are true, which of the following must also be true?

(A) Most of the total taxable income earned by corporations with net income above $100 million was earned from foreign sources.
(B) Wealthy individuals with large personal incomes reported 47 percent of the total taxable income from foreign sources.
(C) Income from foreign sources amounted to between 53 and 60 percent of all reported taxable income.
(D) Some of the corporations with net income above $100 million reported income from 10 or more countries.
(E) Most of the tax returns showing income from 10 or more countries reported net income of more than $100 million.

SECTION 4
Time—30 minutes
30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

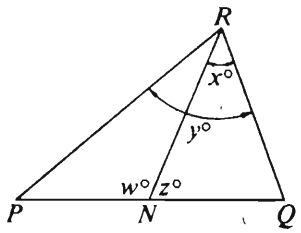
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

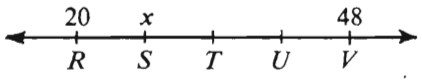


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

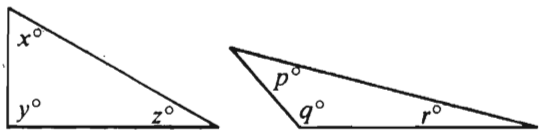
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

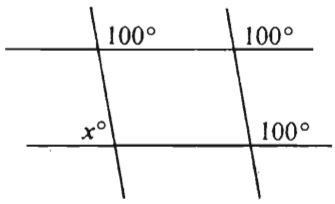
	Column A	Column B
	$x = 9$ and $y = 3$	
1.	$x^2 - 9$	$81 - y^2$
2.	26,003	$2(10^4) + 6(10^3) + 3(10)$
	A size S soup can is 10 centimeters high and a size T soup can is 12.5 centimeters high.	
3.	The height of a stack of cans if each can is size S except the can on the bottom of the stack, which is size T	62.5 centimeters
4.	$\frac{5}{6} + 1$	$\frac{10}{3} - 1$



On the number line above, x is the number that corresponds to point S and $RS = ST = TU = UV$.

5.	x	24

	Column A	Column B
		
6.	$x + y + z$	$p + q + r$
7.	$-2 - (-4)$	$-1 + (-5)$



8.	x	100
	$r > \frac{s}{3} > 0$	
9.	r	s

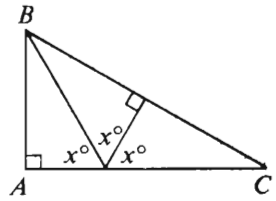
GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	In a certain school, 75 students are enrolled in English, 85 students are enrolled in mathematics, and 60 students are enrolled in both.	
10.	The ratio of the number of students enrolled in both English and mathematics to the number of students enrolled in English	$\frac{3}{5}$

$3x - y = 10$

11.	$\frac{6x - 2y}{3}$	$\frac{19}{3}$



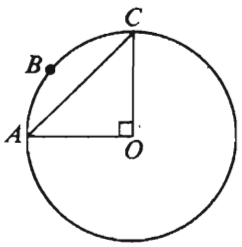
$\angle ABC = y°$

12.	x	y

	Column A	Column B
13.	The average of three numbers, the greatest of which is 78	The average of three numbers, the greatest of which is 3

The total cost of renting a boat was originally to be shared equally by 8 people. If the number of people is increased by 4, the cost per person will be \$1 less.

14.	The total cost of renting the boat	\$25



O is the center of the circle.
The area of $\triangle ACO$ is 2.

15.	The length of arc ABC	π

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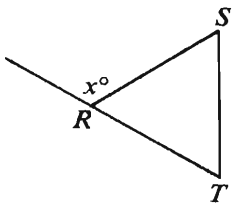
Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. A supervisor was paid for her travel expenses at the rate of \$0.20 per mile. If she received \$14.40, for how many miles was she paid?

(A) 28.8 (B) 36 (C) 57.6
(D) 72 (E) 144



17. If $RS = ST = TR$ in the figure above, what is the value of x?

(A) 60 (B) 90 (C) 120
(D) 135 (E) 180

18. How many layers of gold leaf, each 0.00001 inch thick, would be required to cover an object with a coating of gold leaf 0.1 inch thick?

(A) 100,000
(B) 10,000
(C) 1,000
(D) 100
(E) 10

19. If $y = 8x + 12$ and $x = z + 2$, what is y in terms of z?

(A) $z + 14$ (B) $8z - 4$ (C) $8z + 10$
(D) $8z + 14$ (E) $8z + 28$

20. If a, b, and c are three consecutive integers and if $a > b > c$, then $(a - b)(a - c)(b - c) =$

(A) 2
(B) 1
(C) 0
(D) -1
(E) -2

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following data.

AVERAGE COSTS TO OPERATE THREE TYPES OF CARS OVER A FOUR-YEAR PERIOD

(based on 15,000 miles per year)

	Standard Car	Compact Car	Subcompact Car
Purchase Price	$8,000	$5,600	$4,800
Interest	2,112	1,479	1,267
Insurance	2,000	2,000	2,000
Maintenance/Tires	1,120	1,080	920
Fuel*/Oil	6,429	4,500	3,000
Subtotal	19,661	14,659	11,987
Resale Value	−2,000	−1,400	−1,200
Total Cost to Operate the Car	$17,661	$13,259	$10,787

AVERAGE ANNUAL SAVINGS* THROUGH CAR-POOLING TO WORK RATHER THAN DRIVING ALONE

Type of Car	Annual Cost Driving to Work Alone	Annual Savings Per Person			
		2-person Car Pool	3-person Car Pool	4-person Car Pool	5-person Car Pool
Standard	$2,491	$1,146	$1,544	$1,719	$1,843
Compact	1,870	860	1,159	1,290	1,384
Subcompact	1,521	700	943	1,050	1,126

GO ON TO THE NEXT PAGE.

AVERAGE DAILY COST* OF VAN-POOLING TO WORK

Round-Trip Miles	Van Pool Cost per Passenger
20	$1.45
25	1.54
30	1.63
40	1.81
50	1.99
60	2.17

* Based on $1.50 per gallon for fuel

21. What is the difference between the average purchase prices of a standard car and a compact car?

    (A) $600 (B) $2,400 (C) $2,800
    (D) $3,200 (E) $4,400

22. Over the four-year period, the average cost for insurance on a compact car is approximately what percent of the average total cost to operate a compact car?

    (A) 11%
    (B) 13%
    (C) 15%
    (D) 17%
    (E) 19%

23. The average daily cost per passenger in a van pool traveling 50 miles round trip to work is approximately what percent greater than the average daily cost per passenger in a van pool traveling 40 miles round trip to work?

    (A) 8%
    (B) 10%
    (C) 12%
    (D) 13%
    (E) 18%

24. If the cost of oil is negligible, what is the mileage (average miles per gallon of fuel) of a compact car?

    (A) 13
    (B) 18
    (C) 20
    (D) 25
    (E) 28

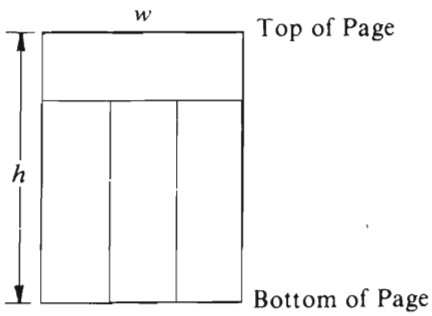
25. If 2 people, who would otherwise be driving alone in subcompact cars, drive in a 2-person car pool using subcompact cars, what is the total of their average annual costs of transportation to work?

    (A) $821 (B) $1,400 (C) $1,521
    (D) $1,642 (E) $2,342

GO ON TO THE NEXT PAGE.

26. Which of the following equations can be used to find the value of x if 7 less than $5x$ is 5 more than the product of 3 and x?

(A) $5x - 7 = 5 + 3x$
(B) $5x - 7 = 5 + (3 + x)$
(C) $7 - 5x = 5 + 3x$
(D) $7 - 5x = (5 + 3)x$
(E) $7 - 5x + 5 = 3x$



27. The figure above shows the dimensions of a page that has been divided into four rectangular advertising spaces of equal area. What is the height, in terms of h, of one of the advertising spaces at the bottom of the page?

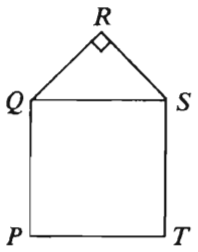
(A) $\frac{1}{4}h$ (B) $\frac{1}{3}h$ (C) $\frac{1}{2}h$
(D) $\frac{2}{3}h$ (E) $\frac{3}{4}h$

28. The ratio of $\left(\frac{1}{2}\right)^3$ to $\left(\frac{1}{2}\right)^4$ is

(A) $\frac{2}{1}$ (B) $\frac{3}{2}$ (C) $\frac{3}{4}$ (D) $\frac{1}{2}$ (E) $\frac{1}{4}$

29. $\left(1 - \frac{x}{x+1}\right) - \frac{1-x}{x+1} =$

(A) 0
(B) 1
(C) $\frac{1}{x+1}$
(D) $\frac{x}{x+1}$
(E) $\frac{-2x}{x+1}$



30. The area of square $PQST$ in the figure above is 100. If $QR = RS$, what is the perimeter of $\triangle QRS$?

(A) $5\sqrt{2} + 10$ (B) 20 (C) $10\sqrt{2} + 10$
(D) 30 (E) $20\sqrt{2} + 10$

SECTION 5
Time—30 minutes
38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Although the minuet appeared simple, its ——— steps had to be studied very carefully before they could be gracefully ——— in public.
   (A) progressive..revealed
   (B) intricate..executed
   (C) rudimentary..allowed
   (D) minute..discussed
   (E) entertaining..stylized

2. The results of the experiments performed by Elizabeth Hazen and Rachel Brown were ——— not only because these results challenged old assumptions but also because they called the ——— methodology into question.
   (A) provocative..prevailing
   (B) predictable..contemporary
   (C) inconclusive..traditional
   (D) intriguing..projected
   (E) specious..original

3. Despite the ——— of many of their colleagues, some scholars have begun to emphasize "pop culture" as a key for ——— the myths, hopes, and fears of contemporary society.
   (A) antipathy..entangling
   (B) discernment..evaluating
   (C) pedantry..reinstating
   (D) skepticism..deciphering
   (E) enthusiasm..symbolizing

4. In the seventeenth century, direct flouting of a generally accepted system of values was regarded as ———, even as a sign of madness.
   (A) adventurous (B) frivolous
   (C) willful (D) impermissible
   (E) irrational

5. Queen Elizabeth I has quite correctly been called a ——— of the arts, because many young artists received her patronage.
   (A) connoisseur (B) critic (C) friend
   (D) scourge (E) judge

6. Because outlaws were denied ——— under medieval law, anyone could raise a hand against them with legal ———.
   (A) propriety..authority
   (B) protection..impunity
   (C) collusion..consent
   (D) rights..collaboration
   (E) provisions..validity

7. Rather than enhancing a country's security, the successful development of nuclear weapons could serve at first to increase that country's ———.
   (A) boldness (B) influence
   (C) responsibility (D) moderation
   (E) vulnerability

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. WATER:SWIM :: (A) grass:grow
(B) knot:tie (C) plan:implement
(D) flood:damage (E) snow:ski

9. TILE:MOSAIC :: (A) wood:totem
(B) stitch:sampler (C) ink:scroll
(D) pedestal:column (E) tapestry:rug

10. SCHOOL:FISH :: (A) posse:crowd
(B) arrow:feathers (C) union:labor
(D) flock:birds (E) stock:cattle

11. CASTIGATION:DISAPPROVAL ::
(A) grief:indignation
(B) hostility:intention
(C) hope:insight
(D) innocence:patience
(E) blasphemy:irreverence

12. REDOUBTABLE:AWE ::
(A) tart:pungency
(B) tacit:solitude
(C) despicable:contempt
(D) engrossing:obliviousness
(E) venerable:renown

13. ACCELERATE:SPEED ::
(A) assess:value
(B) elaborate:quality
(C) disperse:strength
(D) prolong:duration
(E) enumerate:quantity

14. COMPLAIN:CARP :: (A) supply:donate
(B) argue:debate (C) grumble:accuse
(D) drink:guzzle (E) pacify:intervene

15. FILIGREE:WIRE :: (A) embroidery:knot
(B) bead:string (C) lace:thread
(D) fringe:yarn (E) rope:strand

16. SKIRMISH:INSIGNIFICANCE ::
(A) revolution:democracy
(B) duel:formality
(C) feud:impartiality
(D) bout:sparring
(E) crusade:remoteness

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Thomas Hardy's impulses as a writer, all of which he indulged in his novels, were numerous and divergent, and they did not always work together in harmony. Hardy was to some degree interested in exploring his characters' psychologies, though impelled less by curiosity than by sympathy. Occasionally he felt the impulse to comedy (in all its detached coldness) as well as the impulse to farce, but he was more often inclined to see tragedy and record it. He was also inclined to literary realism in the several senses of that phrase. He wanted to describe ordinary human beings; he wanted to speculate on their dilemmas rationally (and, unfortunately, even schematically); and he wanted to record precisely the material universe. Finally, he wanted to be more than a realist. He wanted to transcend what he considered to be the banality of solely recording things exactly and to express as well his awareness of the occult and the strange.

In his novels these various impulses were sacrificed to each other inevitably and often. Inevitably, because Hardy did not care in the way that novelists such as Flaubert or James cared, and therefore took paths of least resistance. Thus, one impulse often surrendered to a fresher one and, unfortunately, instead of exacting a compromise, simply disappeared. A desire to throw over reality a light that never was might give way abruptly to the desire on the part of what we might consider a novelist-scientist to record exactly and concretely the structure and texture of a flower. In this instance, the new impulse was at least an energetic one, and thus its indulgence did not result in a relaxed style. But on other occasions Hardy abandoned a perilous, risky, and highly energizing impulse in favor of what was for him the fatally relaxing impulse to classify and schematize abstractly. When a relaxing impulse was indulged, the style—that sure index of an author's literary worth—was certain to become verbose. Hardy's weakness derived from his apparent inability to control the comings and goings of these divergent impulses and from his unwillingness to cultivate and sustain the energetic and risky ones. He submitted to first one and then another, and the spirit blew where it listed; hence the unevenness of any one of his novels. His most controlled novel, *Under the Greenwood Tree*, prominently exhibits two different but reconcilable impulses—a desire to be a realist-historian and a desire to be a psychologist of love—but the slight interlockings of plot are not enough to bind the two completely together. Thus even this book splits into two distinct parts.

17. Which of the following is the most appropriate title for the passage, based on its content?
    (A) *Under the Greenwood Tree*: Hardy's Ambiguous Triumph
    (B) The Real and the Strange: The Novelist's Shifting Realms
    (C) Energy *Versus* Repose: The Role of Ordinary People in Hardy's Fiction
    (D) Hardy's Novelistic Impulses: The Problem of Control
    (E) Divergent Impulses: The Issue of Unity in the Novel

18. The passage suggests that the author would be most likely to agree with which of the following statements about literary realism?
    (A) Literary realism is most concerned with the exploration of the internal lives of ordinary human beings.
    (B) The term "literary realism" is susceptible to more than a single definition.
    (C) Literary realism and an interest in psychology are likely to be at odds in a novelist's work.
    (D) "Literary realism" is the term most often used by critics in describing the method of Hardy's novels.
    (E) A propensity toward literary realism is a less interesting novelistic impulse than is an interest in the occult and the strange.

19. The author of the passage considers a writer's style to be
    (A) a reliable means by which to measure the writer's literary merit
    (B) most apparent in those parts of the writer's work that are not realistic
    (C) problematic when the writer attempts to follow perilous or risky impulses
    (D) shaped primarily by the writer's desire to classify and schematize
    (E) the most accurate index of the writer's literary reputation

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20. Which of the following words could best be substituted for "relaxed" (line 37) without substantially changing the author's meaning?

(A) informal
(B) confined
(C) risky
(D) wordy
(E) metaphoric

21. The passage supplies information to suggest that its author would be most likely to agree with which of the following statements about the novelists Flaubert and James?

(A) They indulged more impulses in their novels than did Hardy in his novels.
(B) They have elicited a greater degree of favorable response from most literary critics than has Hardy.
(C) In the writing of their novels, they often took pains to effect a compromise among their various novelistic impulses.
(D) Regarding novelistic construction, they cared more about the opinions of other novelists than about the opinions of ordinary readers.
(E) They wrote novels in which the impulse toward realism and the impulse away from realism were evident in equal measure.

22. Which of the following statements best describes the organization of lines 27 to 41 of the passage ("Thus . . . abstractly")?

(A) The author makes a disapproving observation and then presents two cases, one of which leads to a qualification of his disapproval and the other of which does not.
(B) The author draws a conclusion from a previous statement, explains his conclusion in detail, and then gives a series of examples that have the effect of resolving an inconsistency.
(C) The author concedes a point and then makes a counterargument, using an extended comparison and contrast that qualifies his original concession.
(D) The author makes a judgment, points out an exception to his judgment, and then contradicts his original assertion.
(E) The author summarizes and explains an argument and then advances a brief history of opposing arguments.

23. Which of the following statements about the use of comedy in Hardy's novels is best supported by the passage?

(A) Hardy's use of comedy in his novels tended to weaken his literary style.
(B) Hardy's use of comedy in his novels was inspired by his natural sympathy.
(C) Comedy appeared less frequently in Hardy's novels than did tragedy.
(D) Comedy played an important role in Hardy's novels though that comedy was usually in the form of farce.
(E) Comedy played a secondary role in Hardy's more controlled novels only.

24. The author implies which of the following about *Under the Greenwood Tree* in relation to Hardy's other novels?

(A) It is Hardy's most thorough investigation of the psychology of love.
(B) Although it is his most controlled novel, it does not exhibit any harsh or risky impulses.
(C) It, more than his other novels, reveals Hardy as a realist interested in the history of ordinary human beings.
(D) In it Hardy's novelistic impulses are managed somewhat better than in his other novels.
(E) Its plot, like the plots of all of Hardy's other novels, splits into two distinct parts.

GO ON TO THE NEXT PAGE.

Upwards of a billion stars in our galaxy have burnt up their internal energy sources, and so can no longer produce the heat a star needs to oppose the inward force of gravity. These stars, of more than a few solar masses, evolve, in general, much more rapidly than does a star like the Sun. Moreover, it is just these more massive stars whose collapse does not halt at intermediate stages (that is, as white dwarfs or neutron stars). Instead, the collapse continues until a singularity (an infinitely dense concentration of matter) is reached.

It would be wonderful to observe a singularity and obtain direct evidence of the undoubtedly bizarre phenomena that occur near one. Unfortunately in most cases a distant observer cannot see the singularity; outgoing light rays are dragged back by gravity so forcefully that even if they could start out within a few kilometers of the singularity, they would end up in the singularity itself.

25. The author's primary purpose in the passage is to
    (A) describe the formation and nature of singularities
    (B) explain why large numbers of stars become singularities
    (C) compare the characteristics of singularities with those of stars
    (D) explain what happens during the stages of a singularity's formation
    (E) imply that singularities could be more easily studied if observers could get closer to them

26. The passage suggests which of the following about the Sun?
    I. The Sun could evolve to a stage of collapse that is less dense than a singularity.
    II. In the Sun, the inward force of gravity is balanced by the generation of heat.
    III. The Sun emits more observable light than does a white dwarf or a neutron star.
    (A) I only
    (B) III only
    (C) I and II only
    (D) II and III only
    (E) I, II, and III

27. Which of the following sentences would most probably follow the last sentence of the passage?
    (A) Thus, a physicist interested in studying phenomena near singularities would necessarily hope to find a singularity with a measurable gravitational field.
    (B) Accordingly, physicists to date have been unable to observe directly any singularity.
    (C) It is specifically this startling phenomenon that has allowed us to codify the scant information currently available about singularities.
    (D) Moreover, the existence of this extraordinary phenomenon is implied in the extensive reports of several physicists.
    (E) Although unanticipated, phenomena such as these are consistent with the structure of a singularity.

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. STABILIZE: (A) penetrate
(B) minimize (C) fluctuate
(D) analyze (E) isolate

29. RENOVATE: (A) design to specifications
(B) keep hidden (C) cause to decay
(D) duplicate (E) complicate

30. PROFUSE: (A) sequential (B) shoddy
(C) scant (D) surly (E) supreme

31. ANCHOR: (A) unwind (B) unbend
(C) disjoin (D) disrupt (E) dislodge

32. REFUTE: (A) reveal (B) associate
(C) recognize (D) understand (E) prove

33. NADIR:
(A) immobile object
(B) uniform measurement
(C) extreme distance
(D) topmost point
(E) regular phenomenon

34. APPROBATION: (A) disinclination
(B) stagnation (C) condemnation
(D) false allegation (E) immediate repulsion

35. FATUOUSNESS: (A) sensibleness
(B) courage (C) obedience
(D) aloofness (E) forcefulness

36. TIMOROUS: (A) consummate (B) faithful
(C) intrepid (D) antagonistic
(E) impulsive

37. SEMINAL:
(A) withholding peripheral information
(B) promoting spirited exchange
(C) suggesting contradictory hypotheses
(D) displaying cultural biases
(E) hampering further development

38. DISINGENUOUSNESS:
(A) coherent thought
(B) polite conversation
(C) acquisitiveness
(D) guilelessness
(E) contentiousness

SECTION 6
Time—30 minutes
25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-4

Six products—U, V, W, X, Y, and Z—are to be placed in the display window of a vending machine with six compartments, numbered 1 through 6 from left to right. The products must be placed in the window, one product in each compartment, according to the following conditions:

U cannot be immediately to the left or immediately to the right of V.
W must be immediately to the left of X.
Z cannot be in compartment 6.

1. Which of the following products CANNOT be placed in compartment 1 ?
   (A) U (B) V (C) W (D) X (E) Z

2. If X is placed in compartment 3, W must be placed in compartment
   (A) 1 (B) 2 (C) 4 (D) 5 (E) 6

3. If U is placed in compartment 5, which of the following products must be placed in compartment 6 ?
   (A) V (B) W (C) X (D) Y (E) Z

4. If Z is placed in compartment 3, immediately to the right of X, which of the following products must be placed in compartment 5 ?
   (A) U (B) V (C) W (D) X (E) Y

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5. Athletic director: "Members of our sports teams included, for the fall season, 80 football players and 40 cross-country runners; for the winter season, 20 wrestlers and 40 swimmers; for the spring season, 50 track-team members and 20 lacrosse players. Each team athlete participates in his or her sport five days a week for the whole three-month season, and no athlete is on two teams during any one season. Therefore, adding these figures, we find that our team sports program serves 250 different individual athletes."

   In drawing the conclusion above, the athletic director fails to consider the relevant possibility that

   (A) athletes can be on more than one team in a single season
   (B) athletes can be on teams in more than one season
   (C) some of the team sports require a larger number of athletes on the team than do others
   (D) more athletes participate in team sports during one season than during another
   (E) an athlete might not participate in every one of the practice sessions and athletic contests in his or her sport

6. As soon as any part of a person's conduct affects prejudicially the interests of others, society has jurisdiction over it, and the question of whether the general welfare will or will not be promoted by interfering with it becomes open to discussion. If a person's conduct does not affect prejudicially the interests of others, it should not come under the jurisdiction of society in the first place.

   The author in the passage above argues that

   (A) society is independent of the actions of individuals
   (B) the general welfare of a society is promoted when a person's conduct benefits others
   (C) conduct that does not infringe on the interests of others should not be under the jurisdiction of society
   (D) interference with the actions of individuals does not enhance the general welfare
   (E) in general, the interests of persons are mutually exclusive

7. Therapists find that treatment of those people who seek help because they are unable to stop smoking or overeating is rarely successful. From these experiences, therapists have concluded that such habits are intractable, and success in breaking them is rare.

   As surveys show, millions of people have dropped the habit of smoking, and many people have successfully managed a substantial weight loss.

   If all of the statements above are correct, an explanation of their apparent contradiction is provided by the hypothesis that

   (A) there have been some successes in therapy, and those successes were counted in the surveys
   (B) it is easier to stop smoking than it is to stop overeating
   (C) it is easy to break the habits of smoking and overeating by exercising willpower
   (D) the group of people selected for the survey did not include those who failed to break their habits even after therapy
   (E) those who succeed in curing themselves do not go for treatment and so are not included in the therapists' data

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Questions 8-11

Seven people—Tomás, Nadine, Pavel, Marta, Rachel, Fred, and Kurt—are planning to travel down a river on two rafts. The group will be assigned to the rafts according to the following conditions:

Tomás must be assigned to the same raft as Rachel.
Fred cannot be on the same raft as Pavel unless Marta is also on that raft.
The maximum number of persons on each raft is four.
Neither Nadine nor Pavel can be assigned to the same raft as Kurt.

8. If Fred is assigned to the same raft as Nadine, which of the following must be true?
   (A) Kurt is assigned to the other raft.
   (B) Marta is assigned to the other raft.
   (C) Pavel is assigned to the other raft.
   (D) Rachel is assigned to the same raft as Fred and Nadine.
   (E) Tomás is assigned to the same raft as Fred and Nadine.

9. If Rachel is assigned to the same raft as Pavel, which of the following must be true?
   (A) Kurt is assigned to the same raft as Rachel and Pavel.
   (B) Nadine is assigned to the same raft as Kurt.
   (C) Nadine is assigned to the raft other than the one to which Pavel is assigned.
   (D) Rachel and Pavel are assigned to the raft carrying four people.
   (E) Tomás is assigned to the raft other than the one to which Pavel is assigned.

10. If Kurt is assigned to the same raft as Marta, which of the following must be true?
    (A) Fred is assigned to the same raft as Nadine.
    (B) Fred is assigned to the same raft as Tomás.
    (C) Nadine is assigned to the same raft as Pavel.
    (D) Nadine is assigned to the same raft as Kurt and Marta.
    (E) Rachel is assigned to the same raft as Kurt and Marta.

11. If Rachel is assigned to the same raft as Fred, which of the following is a complete and accurate list of the people who must then be assigned to the other raft?
    (A) Fred, Pavel
    (B) Kurt, Tomás
    (C) Marta, Tomás
    (D) Kurt, Marta, Nadine
    (E) Marta, Nadine, Pavel

GO ON TO THE NEXT PAGE.

Questions 12-15

Central Bank is open from Monday through Friday each week. Each day that the bank is open, one bank officer is assigned as AM loan officer and a different bank officer is assigned as PM loan officer. The bank has five officers—Reynolds, Short, Torrez, Underwood, and Vance. The assignment of loan officers is always made in accordance with the following conditions:

Each officer must be assigned as loan officer at least once each week.
An officer is never assigned as a loan officer consecutive days in the same week.
Torrez is never assigned as the AM loan officer.
Vance is always assigned as the PM loan officer on Monday and Wednesday, and has no other assignments.
Underwood is never assigned to be a loan officer on the same day that Short is assigned to be a loan officer.

12. Which of the following is an acceptable assignment of loan officers for a single week?

		Monday	Tuesday	Wednesday	Thursday	Friday
(A)	AM	Underwood	Short	Reynolds	Torrez	Short
	PM	Vance	Torrez	Vance	Underwood	Torrez
(B)	AM	Short	Short	Reynolds	Torrez	Reynolds
	PM	Vance	Torrez	Vance	Short	Torrez
(C)	AM	Short	Torrez	Short	Reynolds	Short
	PM	Reynolds	Vance	Vance	Torrez	Underwood
(D)	AM	Underwood	Short	Reynolds	Short	Reynolds
	PM	Vance	Torrez	Vance	Torrez	Underwood
(E)	AM	Underwood	Torrez	Underwood	Reynolds	Underwood
	PM	Vance	Reynolds	Short	Torrez	Vance

13. What is the maximum number of times that Torrez could be assigned as loan officer in a single week?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

14. In a week in which Underwood is assigned as PM loan officer on Tuesday, which of the following must be true?

(A) Underwood is assigned as the PM loan officer on Thursday.
(B) Reynolds is assigned as the AM loan officer on Friday.
(C) Reynolds is assigned as the AM loan officer on Tuesday.
(D) Short is assigned as the AM loan officer on Thursday.
(E) Underwood is assigned as the AM loan officer on Friday.

15. In a week in which Torrez' only assignment as a loan officer is on Friday, which of the following must be true?

(A) Reynolds is assigned as a loan officer on Tuesday.
(B) Reynolds is assigned as a loan officer on Wednesday.
(C) Reynolds is assigned as a loan officer on Friday.
(D) Underwood is assigned as a loan officer on Thursday.
(E) Underwood is assigned as a loan officer on Friday.

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Questions 16-22

Five patients—L, M, N, O, and P—must be scheduled to undergo physical therapy treatments within a seven-day period beginning on the first day of a month and ending on the seventh day of the same month. Exactly one patient can be treated per day. The schedule must accommodate the following conditions:

L is to receive exactly two treatments; the second treatment must be scheduled for the fourth day after the day of the first treatment.
M is to receive exactly one treatment.
N is to receive exactly one treatment, which must be scheduled for either the day before or the day after the day of L's first treatment.
O is to receive exactly one treatment, which must be scheduled for a day anytime before the day of L's second treatment.
P is to receive exactly one treatment, which must be scheduled for the third day after the day of M's treatment.

16. Any of the five patients could be scheduled for the first day of the month EXCEPT

(A) L (B) M (C) N (D) O (E) P

17. Which of the following is a possible schedule, including the open day for which no patient is scheduled, from the first day through the seventh day of the month?

(A) L, M, N, O, L, P, open day
(B) M, L, N, P, open day, L, O
(C) N, L, M, O, P, L, open day
(D) N, L, O, M, open day, L, P
(E) Open day, L, M, O, L, N, P

18. The day of M's treatment must be no more than how many days after L's first treatment?

(A) 1 (B) 2 (C) 3 (D) 4 (E) 5

19. N could be scheduled for any of the following days EXCEPT the

(A) first (B) second (C) third (D) fourth (E) fifth

20. If M is to be scheduled for the first day of the month, which of the following pairs of patients CANNOT be scheduled for consecutive days?

(A) L and P
(B) M and L
(C) M and N
(D) N and O
(E) N and P

21. If no patient is to be scheduled for the first of the month, which of the following could be true?

(A) M is scheduled for the day before the day of L's first treatment.
(B) N is scheduled for the day before the day of L's first treatment.
(C) O is scheduled for the day before the day of L's first treatment.
(D) P is scheduled for the day before the day of L's second treatment.
(E) P is scheduled for the day after the day of O's treatment.

22. If N is scheduled for the day before the day of L's first treatment, the days for which M's treatment can be scheduled include the

(A) first day and second day
(B) first day and fourth day
(C) second day and third day
(D) second day and fourth day
(E) third day and fourth day

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23. The Supreme Court is no longer able to keep pace with the tremendous number of cases it agrees to decide. The Court schedules and hears 160 hours of oral argument each year, and 108 hours of next year's term will be taken up by cases left over from this year. Certainly the Court cannot be asked to increase its already burdensome hours. The most reasonable long-range solution to this problem is to allow the Court to decide many cases without hearing oral argument; in this way the Court might eventually increase dramatically the number of cases it decides each year.

Which of the following, if true, could best be used to argue against the feasibility of the solution suggested above?

(A) The time the Court spends hearing oral argument is only a small part of the total time it spends deciding a case.
(B) The Court cannot legitimately avoid hearing oral argument in any case left over from last year.
(C) Most authorities agree that 160 hours of oral argument is the maximum number that the Court can handle per year.
(D) Even now the Court decides a small number of cases without hearing oral argument.
(E) In many cases, the delay of a hearing for a full year can be extremely expensive to the parties involved.

24. That social institutions influence the formation of character has become a generally accepted proposition. This doctrine views individuals as but compliant recipients of social influence: personalities are entirely the products of society, and at any point in life an individual's personality can be changed by management of the social world. Crime is said to exist only because society has in some ways failed in its responsibility to give every person the resources to lead a productive life. However, whereas it is true that extreme poverty forces some people to steal, it is obvious that some persons will commit crimes no matter how well society treats them.

Which of the following is implied by the "doctrine" (line 3) described in the passage above?

(A) Social institutions may reflect personality as much as they shape it.
(B) Social influence on personality is most strongly felt by the affluent.
(C) The concentration of wealth in the hands of a privileged few accounts for the existence of crime.
(D) Bringing about social reform is the most likely means of curtailing crime.
(E) Less severe punishment of crime would be likely to result in more crime.

25. The sense of delayed gratification, of working now for later pleasure, has helped shape the economic behavior of our society. However, that sense is no longer nurtured as consistently in our children as it once was. For example, it used to take a bit of patience to put together the toys that children got in cereal boxes; now the toys come from the boxes whole.

Which of the following is an assumption of the passage above?

(A) The toys in cereal boxes have changed partly because the economic conditions of our society have improved.
(B) The influence of promotion gimmicks on the economic behavior of our society has increased over the years.
(C) The toys that used to come in cereal boxes were put together by the same children who played with them.
(D) Part of the pleasure of any toy lies in putting the toy together before playing with it.
(E) Today's children do not expect a single toy to provide pleasure for a long period of time.

FOR GENERAL TEST 25 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 2			Section 5		
Number	Answer	P+	Number	Answer	P+
1	E	89	1	B	80
2	B	66	2	A	69
3	A	52	3	D	76
4	C	58	4	E	67
5	E	51	5	C	64
6	D	45	6	B	59
7	A	10	7	E	66
8	C	82	8	E	96
9	E	80	9	B	41
10	B	61	10	D	87
11	C	82	11	E	67
12	D	36	12	C	38
13	D	35	13	D	53
14	E	48	14	D	33
15	C	46	15	C	37
16	D	23	16	B	25
17	C	89	17	D	70
18	B	77	18	B	44
19	A	21	19	A	36
20	B	69	20	D	19
21	C	80	21	C	71
22	D	62	22	A	30
23	B	43	23	C	66
24	B	64	24	D	47
25	A	59	25	A	49
26	E	42	26	C	33
27	D	66	27	B	60
28	E	86	28	C	94
29	B	82	29	C	85
30	E	81	30	C	72
31	E	51	31	E	79
32	A	44	32	E	59
33	E	52	33	D	43
34	D	49	34	C	45
35	A	46	35	A	41
36	A	27	36	C	34
37	A	28	37	E	27
38	C	23	38	D	24

QUANTITATIVE ABILITY					
Section 1			Section 4		
Number	Answer	P+	Number	Answer	P+
1	C	84	1	C	89
2	B	87	2	B	90
3	A	90	3	D	88
4	C	75	4	B	90
5	C	76	5	A	81
6	B	69	6	C	83
7	D	65	7	A	85
8	C	53	8	B	71
9	A	69	9	D	61
10	C	53	10	A	77
11	D	34	11	A	56
12	B	59	12	C	42
13	A	42	13	D	42
14	A	36	14	B	49
15	D	33	15	C	31
16	A	88	16	D	96
17	E	86	17	C	82
18	B	82	18	B	77
19	D	83	19	E	71
20	C	75	20	A	69
21	D	94	21	B	92
22	B	80	22	C	57
23	C	66	23	B	51
24	A	48	24	C	34
25	C	44	25	D	28
26	B	52	26	A	62
27	B	50	27	E	62
28	D	30	28	A	51
29	A	26	29	D	46
30	E	44	30	C	47

ANALYTICAL ABILITY					
Section 3			Section 6		
Number	Answer	P+	Number	Answer	P+
1	B	82	1	D	68
2	A	75	2	B	92
3	C	89	3	D	85
4	B	31	4	E	74
5	C	47	5	B	76
6	D	58	6	C	88
7	E	46	7	E	68
8	B	88	8	A	82
9	D	86	9	D	69
10	A	53	10	C	63
11	E	76	11	E	70
12	B	42	12	D	80
13	C	51	13	B	33
14	A	56	14	C	31
15	E	76	15	A	16
16	A	26	16	E	49
17	C	75	17	D	52
18	E	28	18	C	34
19	A	35	19	E	33
20	E	20	20	D	23
21	B	23	21	A	20
22	C	41	22	B	31
23	E	21	23	A	50
24	C	37	24	D	31
25	D	24	25	C	30

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 25 ONLY AND THE PERCENTS BELOW*

Raw Score	Scaled Scores and Percents Below						Raw Score	Scaled Scores and Percents Below					
	Verbal	%	Quantitative	%	Analytical	%		Verbal	%	Quantitative	%	Analytical	%
72-76	800	99					35	410	32	500	38	660	86
71	790	99					34	400	29	490	35	640	83
							33	390	27	470	31	630	81
70	780	99					32	380	25	460	28	610	78
69	770	99					31	370	22	450	26	590	73
68	750	98											
67	740	98					30	360	20	430	22	570	68
66	730	97					29	360	20	420	20	560	65
							28	350	18	410	18	540	60
65	720	96					27	340	16	390	15	520	54
64	700	95					26	330	14	380	13	510	51
63	690	94											
62	680	93					25	320	12	370	12	490	46
61	670	92					24	310	11	350	9	470	39
							23	300	10	340	8	450	34
60	660	91	800	99			22	290	8	330	7	440	30
59	650	89	800	99			21	280	7	320	6	420	26
58	630	86	800	99									
57	620	85	790	99			20	270	5	300	5	400	21
56	610	83	770	97			19	260	4	290	4	390	19
							18	250	4	280	3	370	15
55	600	81	760	95			17	240	3	260	2	350	11
54	590	80	750	94			16	230	2	250	2	330	8
53	580	78	730	91									
52	570	76	720	89			15	220	1	240	1	320	7
51	560	73	710	87			14	210	1	220	1	300	4
							13	200	0	210	1	280	3
50	550	71	690	83	800	99	12	200		200	0	270	2
49	540	68	680	81	800	99	11	200		200		250	1
48	530	65	670	79	800	99							
47	520	63	650	74	800	99	10	200		200		230	1
46	510	60	640	73	800	99	9	200		200		210	0
							0-8	200		200		200	0
45	500	57	630	70	800	99							
44	490	55	620	67	800	99							
43	480	52	600	64	800	99							
42	470	49	590	61	780	98							
41	460	46	580	58	760	97							
40	450	43	560	53	750	97							
39	440	40	550	51	730	95							
38	430	37	540	48	710	93							
37	420	35	520	43	690	91							
36	410	32	510	41	680	90							

*Percent scoring below the given scaled score, based on the performance of the 785,276 examinees who took the General Test between October 1, 1981, and September 30, 1984.

TEST 26

SECTION 1

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

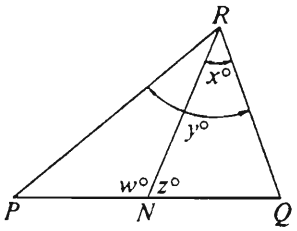
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

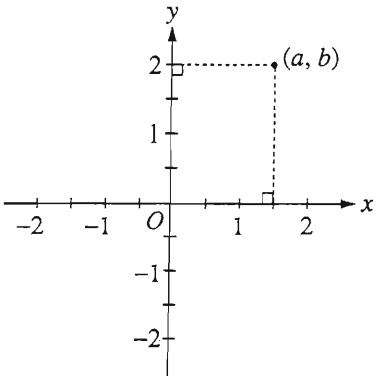


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

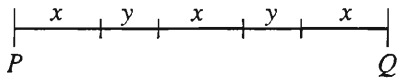
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	Andy earns \$5 per hour. Susan earns \$6 per hour.	
1.	The amount Andy earns in $6\frac{1}{2}$ hours	The amount Susan earns in $5\frac{1}{2}$ hours
	$6x + 2 = 4$ $3y + 1 = 2$	
2.	x	y
3.	$10.01 + 1.1$	11.1



4.	a	b
	The total cost of m equally priced flashlight batteries is p dollars.	
5.	$\frac{m}{p}$	1

	Column A	Column B
	$0 < x < 1$	
6.	$\frac{1}{x}$	x
7.	The radius of a circle with circumference 9π	4.5



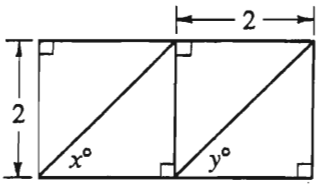
	$x - y = 1$ and the length of PQ is 13.	
8.	x	2.5
9.	$x + 7$	$(x + 7)^3$
	r, s, and t are positive integers, and $r < s < t$	
10.	rt	s^2
11.	$\frac{\sqrt{3}}{2}$	$\frac{3}{4}$

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Column A	Column B
$2x^2 = (2x)^2$	
12. x	1
13. The perimeter of a rectangle that has an area of 48 and a diagonal of length 10	The circumference of a circle that has a radius of length $\frac{14}{\pi}$

Column A	Column B
$y = x^2 - 16x + 64$	
14. The least value of y	0



15. x y

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Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

---

16. If a rectangular picture that measures 4 feet from side to side is hung exactly in the middle of a rectangular wall that measures 13 feet from side to side, then the left edge of the picture is how many feet from the left edge of the wall?

(A) 2.0
(B) 3.0
(C) 4.5
(D) 6.5
(E) 9.0

17. $12^2 + 13^2 - \left[2(12)(13)\left(\frac{12}{13}\right)\right] =$

(A) 313
(B) 289
(C) 169
(D) 25
(E) 1

18. One morning a baker used 40 percent of a 50-pound bag of flour. If $\frac{1}{8}$ of the amount used was for doughnuts, how many pounds of flour were used for doughnuts?

(A) $2\frac{1}{2}$
(B) $6\frac{1}{4}$
(C) $15\frac{5}{8}$
(D) 20
(E) 25

19. If $x = 2y = 3z = 36$, then the average (arithmetic mean) of x, y, and z is

(A) 33
(B) 22
(C) 18
(D) 12
(E) 6

20. What is the ratio of the perimeter of a pentagon with each side of length 6 to the perimeter of an octagon with each side of length 6 ?

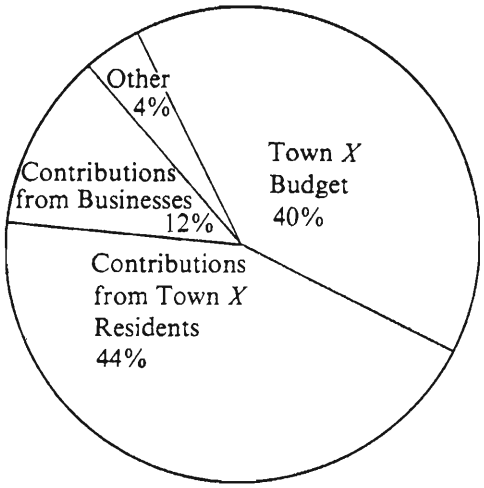
(A) $\frac{5}{6}$
(B) $\frac{4}{5}$
(C) $\frac{3}{4}$
(D) $\frac{2}{3}$
(E) $\frac{5}{8}$

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following data.

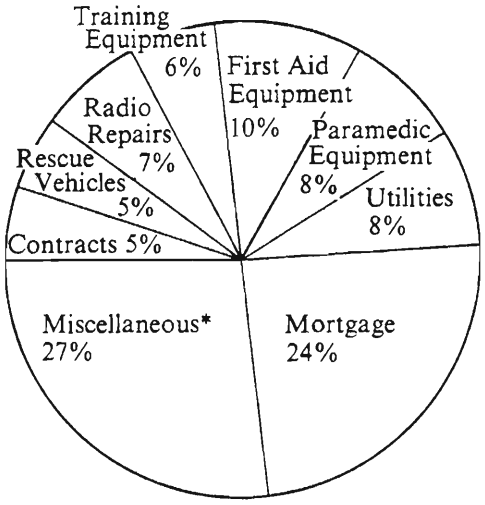
INCOME, EXPENSES, AND CALL STATISTICS FOR THE TOWN *X* RESCUE SQUAD LAST YEAR

INCOME



Total Income = $50,000

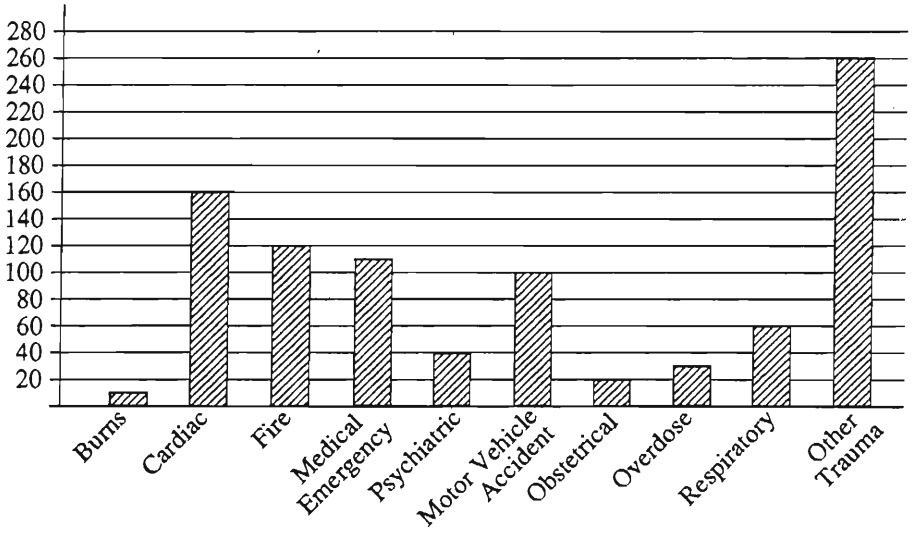
EXPENSES



Total Expenses = $50,000

*Includes insurance, business supplies, fuel, uniforms, etc.

NUMBER OF RESCUE SQUAD CALLS BY CATEGORY



Total number of calls (including categories not listed) = 1,000

Note: Drawn to scale.

GO ON TO THE NEXT PAGE.

21. What were the rescue squad's total expenses for training, first aid, and paramedic equipment?

(A) $24,000
(B) $12,000
(C) $10,000
(D) $9,000
(E) $6,000

22. For which category listed below are there only two other categories on the graph with fewer rescue squad calls?

(A) Burns
(B) Fire
(C) Psychiatric
(D) Obstetrical
(E) Overdose

23. Contributions to the rescue squad from Town *X* residents were how much greater than contributions from businesses?

(A) $16,000
(B) $22,000
(C) $24,000
(D) $28,000
(E) $32,000

24. How many of the total number of rescue squad calls were in categories not listed?

(A) 70
(B) 80
(C) 90
(D) 100
(E) 110

25. The amount by which the rescue squad's mortgage expenses exceeded expenses for utilities was what percent of expenses for utilities?

(A) 16%
(B) 33%
(C) 67%
(D) 200%
(E) 300%

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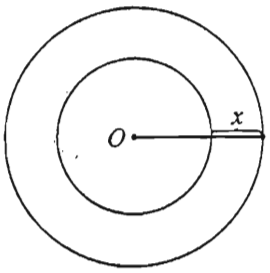

26. The circles above both have center O. If the area of the larger circle is 100π and the area of the smaller circle is 64π, then x is

(A) 2
(B) 3
(C) 4
(D) 6
(E) 18

27. In a certain shipment 2 percent of the boxes shipped were damaged. If the loss per damaged box was \$35 and the total loss due to damage was \$700, how many boxes were shipped?

(A) 2,000
(B) 1,000
(C) 200
(D) 100
(E) 20

28. The sum of n different positive integers is less than 100. What is the greatest possible value of n?

(A) 10
(B) 11
(C) 12
(D) 13
(E) 14

29. If a and b are positive integers, then the ratio of $\frac{a}{b}$ to its reciprocal is

(A) 1
(B) $\frac{a}{b}$
(C) $\frac{b}{a}$
(D) $\frac{a^2}{b^2}$
(E) $\frac{b^2}{a^2}$

30. If $2^n = 128$, then $(2^{n-1})(5^{n-2}) =$

(A) 10^7
(B) $5(10^6)$
(C) $2(10^6)$
(D) $5(10^5)$
(E) $2(10^5)$

SECTION 2

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. The Chinese, who began systematic astronomical and weather observations shortly after the ancient Egyptians, were assiduous record-keepers, and because of this, can claim humanity's longest continuous -------- of natural events.

   (A) defiance (B) documentation
   (C) maintenance (D) theory (E) domination

2. Because many of the minerals found on the ocean floor are still ------- on land, where mining is relatively inexpensive, mining the ocean floor has yet to become a ------- enterprise.

   (A) scarce. .common
   (B) accessible. .marginal
   (C) unidentified. .subsidized
   (D) conserved. .public
   (E) plentiful. .profitable

3. The valedictory address, as it has developed in American colleges and universities over the years, has become a very strict form, a literary ------- that permits very little -------.

   (A) text. .clarity
   (B) work. .tradition
   (C) genre. .deviation
   (D) oration. .grandiloquence
   (E) achievement. .rigidity

4. A human being is quite ------- creature, for the gloss of rationality that covers his or her fears and ------- is thin and often easily breached.

   (A) a logical. .problems
   (B) a frail. .insecurity
   (C) a valiant. .phobias
   (D) an ambitious. .morality
   (E) a ludicrous. .laughter

5. Although the passage of years has softened the initially hostile reaction to his poetry, even now only a few independent observers ------- his works.

   (A) praise (B) revile (C) scrutinize
   (D) criticize (E) neglect

6. Unlike philosophers who constructed theoretically ideal states, she built a theory based on -------; thus, although her constructs may have been inelegant, they were ------- sound.

   (A) reality. .aesthetically
   (B) intuition. .intellectually
   (C) surmise. .scientifically
   (D) experience. .empirically
   (E) conjecture. .factually

7. Once a duckling has identified a parent, the instinctive bond becomes a powerful ------- for additional learning since, by ------- the parent, the duckling can acquire further information that is not genetically transmitted.

   (A) impulse. .surpassing
   (B) referent. .recognizing
   (C) force. .acknowledging
   (D) inspiration. .emulating
   (E) channel. .mimicking

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. INFLATE : BURST ::
   (A) atrophy : evaporate
   (B) pull : tear
   (C) expose : hide
   (D) excavate : increase
   (E) break : shatter

9. FLIP : RESPECT ::
   (A) curt : ignorance
   (B) bleak : firmness
   (C) wry : humor
   (D) nonchalant : concern
   (E) rash : promptness

10. REQUEST : COMMAND ::
    (A) propose : stipulate
    (B) enlist : support
    (C) relegate : consign
    (D) volunteer : accept
    (E) select : reject

11. BOUNDLESS : LIMIT ::
    (A) truncated : length
    (B) voracious : appetite
    (C) impeccable : flaw
    (D) fascinating : interest
    (E) syncopated : beat

12. MOLT : BIRD ::
    (A) slough : snake
    (B) hibernate : bear
    (C) metamorphose : spider
    (D) shuck : oyster
    (E) hatch : egg

13. RENOUNCE : PLEDGE ::
    (A) exculpate : victim
    (B) desecrate : shrine
    (C) recriminate : hero
    (D) redeem : honor
    (E) rescind : order

14. COWARD : CRAVEN ::
    (A) liar : facetious
    (B) dupe : gullible
    (C) commentator : caustic
    (D) judge : impartial
    (E) criminal : hostile

15. ENFRANCHISE : VOTE ::
    (A) advertise : sell
    (B) fumigate : kill
    (C) filter : purify
    (D) illuminate : see
    (E) ignite : burn

16. STRUT : WING ::
    (A) beam : door
    (B) axle : wheel
    (C) guy : pylon
    (D) root : plant
    (E) twig : branch

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

As Gilbert White, Darwin, and others observed long ago, all species appear to have the innate capacity to increase their numbers from generation to generation. The task for ecologists is to untangle the environmental and biological factors that hold this intrinsic capacity for population growth in check over the long run. The great variety of dynamic behaviors exhibited by different populations makes this task more difficult: some populations remain roughly constant from year to year; others exhibit regular cycles of abundance and scarcity; still others vary wildly, with outbreaks and crashes that are in some cases plainly correlated with the weather, and in other cases not.

To impose some order on this kaleidoscope of patterns, one school of thought proposes dividing populations into two groups. These ecologists posit that the relatively steady populations have "density-dependent" growth parameters; that is, rates of birth, death, and migration which depend strongly on population density. The highly varying populations have "density-independent" growth parameters, with vital rates buffeted by environmental events; these rates fluctuate in a way that is wholly independent of population density.

This dichotomy has its uses, but it can cause problems if taken too literally. For one thing, no population can be driven entirely by density-independent factors all the time. No matter how severely or unpredictably birth, death, and migration rates may be fluctuating around their long-term averages, if there were no density-dependent effects, the population would, in the long run, either increase or decrease without bound (barring a miracle by which gains and losses canceled exactly). Put another way, it may be that on average 99 percent of all deaths in a population arise from density-independent causes, and only one percent from factors varying with density. The factors making up the one percent may seem unimportant, and their cause may be correspondingly hard to determine. Yet, whether recognized or not, they will usually determine the long-term average population density.

In order to understand the nature of the ecologist's investigation, we may think of the density-dependent effects on growth parameters as the "signal" ecologists are trying to isolate and interpret, one that tends to make the population increase from relatively low values or decrease from relatively high ones, while the density-independent effects act to produce "noise" in the population dynamics. For populations that remain relatively constant, or that oscillate around repeated cycles, the signal can be fairly easily characterized and its effects described, even though the causative biological mechanism may remain unknown. For irregularly fluctuating populations, we are likely to have too few observations to have any hope of extracting the signal from the overwhelming noise. But it now seems clear that all populations are regulated by a mixture of density-dependent and density-independent effects in varying proportions.

17. The author of the passage is primarily concerned with
    (A) discussing two categories of factors that control population growth and assessing their relative importance
    (B) describing how growth rates in natural populations fluctuate over time and explaining why these changes occur
    (C) proposing a hypothesis concerning population sizes and suggesting ways to test it
    (D) posing a fundamental question about environmental factors in population growth and presenting some currently accepted answers
    (E) refuting a commonly accepted theory about population density and offering a new alternative

18. It can be inferred from the passage that the author considers the dichotomy discussed in the second paragraph to be
    (A) applicable only to erratically fluctuating populations
    (B) useful, but only if its limitations are recognized
    (C) dangerously misleading in most circumstances
    (D) a complete and sufficient way to account for observed phenomena
    (E) conceptually valid, but too confusing to apply on a practical basis

19. Which of the following statements can be inferred from the last paragraph?
    (A) For irregularly fluctuating populations, doubling the number of observations made will probably result in the isolation of density-dependent effects.
    (B) Density-dependent effects on population dynamics do not occur as frequently as do density-independent effects.
    (C) At present, ecologists do not understand any of the underlying causes of the density-dependent effects they observe in population dynamics.
    (D) Density-dependent effects on growth parameters are thought to be caused by some sort of biochemical "signaling" that ecologists hope eventually to understand.
    (E) It is sometimes possible to infer the existence of a density-dependent factor controlling population growth without understanding its causative mechanism.

GO ON TO THE NEXT PAGE.

20. According to the passage, which of the following is a true statement about density-dependent factors in population growth?

(A) They ultimately account for long-term population levels.
(B) They have little to do with long-term population dynamics.
(C) They are always more easily isolated and described than those that are density-independent.
(D) They include random environmental events.
(E) They contradict current ecological assumptions about population dynamics.

21. According to the passage, all of the following behaviors have been exhibited by different populations EXCEPT

(A) roughly constant population levels from year to year
(B) regular cycles of increases and decreases in numbers
(C) erratic increases in numbers correlated with the weather
(D) unchecked increases in numbers over many generations
(E) sudden declines in numbers from time to time

22. The discussion concerning population in lines 24-40 serves primarily to

(A) demonstrate the difficulties ecologists face in studying density-dependent factors limiting population growth
(B) advocate more rigorous study of density-dependent factors in population growth
(C) prove that the death rates of any population are never entirely density-independent
(D) give an example of how death rates function to limit population densities in typical populations
(E) underline the importance of even small density-dependent factors in regulating long-term population densities

23. In the passage, the author does all of the following EXCEPT

(A) cite the views of other biologists
(B) define a basic problem that the passage addresses
(C) present conceptual categories used by other biologists
(D) describe the results of a particular study
(E) draw a conclusion

GO ON TO THE NEXT PAGE.

In *Raisin in the Sun*, Lorraine Hansberry does not reject integration or the economic and moral promise of the American dream; rather, she remains loyal to this dream while looking, realistically, at its incomplete realization. Once we recognize this dual vision, we can accept the play's ironic nuances as deliberate social commentaries by Hansberry rather than as the "unintentional" irony that Bigsby attributes to the work. Indeed, a curiously persistent refusal to credit Hansberry with a capacity for intentional irony has led some critics to interpret the play's thematic conflicts as mere confusion, contradiction, or eclecticism. Isaacs, for example, cannot easily reconcile Hansberry's intense concern for her race with her ideal of human reconciliation. But the play's complex view of Black self-esteem and human solidarity as compatible is no more "contradictory" than Du Bois' famous, well-considered ideal of ethnic self-awareness coexisting with human unity, or Fanon's emphasis on an ideal internationalism that also accommodates national identities and roles.

Line (5) (10) (15)

24. The author's primary purpose in this passage is to
    (A) explain some critics' refusal to consider *Raisin in the Sun* a deliberately ironic play
    (B) suggest that ironic nuances ally *Raisin in the Sun* with Du Bois' and Fanon's writings
    (C) analyze the fundamental dramatic conflicts in *Raisin in the Sun*
    (D) justify the inclusion of contradictory elements in *Raisin in the Sun*
    (E) affirm the thematic coherence underlying *Raisin in the Sun*

25. It can be inferred from the passage that the author believes which of the following about Hansberry's use of irony in *Raisin in the Sun*?
    (A) It derives from Hansberry's eclectic approach to dramatic structure.
    (B) It is justified by Hansberry's loyalty to a favorable depiction of American life.
    (C) It is influenced by the themes of works by Du Bois and Fanon.
    (D) It is more consistent with Hansberry's concern for Black Americans than with her ideal of human reconciliation.
    (E) It reflects Hansberry's reservations about the extent to which the American dream has been realized.

26. In which of the following does the author of the passage reinforce his criticism of responses such as Isaacs' to *Raisin in the Sun*?
    (A) The statement that Hansberry is "loyal" (line 3) to the American dream
    (B) The description of Hansberry's concern for Black Americans as "intense" (line 13)
    (C) The assertion that Hansberry is concerned with "human solidarity" (line 15)
    (D) The description of Du Bois' ideal as "well-considered" (line 17)
    (E) The description of Fanon's internationalism as "ideal" (line 19)

27. The author of the passage would probably consider which of the following judgments to be most similar to the reasoning of critics described in lines 8-12 ?
    (A) The world is certainly flat; therefore, the person proposing to sail around it is unquestionably foolhardy.
    (B) Radioactivity cannot be directly perceived; therefore, a scientist could not possibly control it in a laboratory.
    (C) The painter of this picture could not intend it to be funny; therefore, its humor must result from a lack of skill.
    (D) Traditional social mores are beneficial to culture; therefore, anyone who deviates from them acts destructively.
    (E) Filmmakers who produce documentaries deal exclusively with facts; therefore, a filmmaker who reinterprets particular events is misleading us.

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. ADVOCATE: (A) rectify (B) enforce (C) observe (D) denounce (E) reimburse

29. CORRUGATED: (A) pliant (B) smooth (C) fragile (D) vaporous (E) permeable

30. COVERT: (A) acquainted (B) acclaimed (C) spontaneous (D) open (E) alert

31. EXTRANEOUS: (A) fruitful (B) expeditious (C) neutral (D) relevant (E) precipitous

32. DISTENSION: (A) release (B) dilution (C) implosion (D) angularity (E) compression

33. CONVERSANCE: (A) anonymity (B) brevity (C) lack of familiarity (D) lack of manners (E) lack of enthusiasm

34. EMBOSS: (A) turn over (B) flatten out (C) whittle away (D) roughen (E) unfold

35. QUOTIDIAN: (A) resourceful (B) serious (C) unusual (D) expensive (E) combative

36. TORRIDNESS: (A) solubility (B) volatility (C) frigidity (D) viscosity (E) purity

37. OPPROBRIUM: (A) good repute (B) fair recompense (C) fidelity (D) exposure (E) patience

38. DISABUSE: (A) afflict with pain (B) lead into error (C) force into exile (D) remove from grace (E) free from obligation

SECTION 3

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-7

There will be seven performers in a talent show: a guitarist, a hypnotist, a juggler, a magician, a pianist, a singer, and a ventriloquist. Exactly three of the performers—the guitarist, the pianist, and the singer—will each require a recorded musical accompaniment. The schedule for the show has seven consecutive time slots. Each of the seven performers will appear in exactly one time slot, and each time slot will have exactly one performer appearing in it. The schedule must follow the rules below:

The juggler must appear first.
The ventriloquist cannot appear immediately after the magician.
At most two performers requiring a recorded musical accompaniment can appear in succession.

1. Which of the following is an acceptable schedule for the last four performers in the show?

	Fourth	Fifth	Sixth	Seventh
(A)	Juggler	Hypnotist	Guitarist	Pianist
(B)	Guitarist	Magician	Ventriloquist	Singer
(C)	Magician	Pianist	Singer	Guitarist
(D)	Singer	Guitarist	Pianist	Hypnotist
(E)	Ventriloquist	Hypnotist	Magician	Singer

2. If the ventriloquist appears third, the singer appears fifth, and the pianist appears sixth, which of the following must be true?

(A) The guitarist appears second.
(B) The guitarist appears fourth.
(C) The hypnotist appears second.
(D) The magician appears fourth.
(E) The magician appears seventh.

3. If the singer appears third and the pianist appears fourth, the guitarist must appear either

(A) first or second
(B) second or fifth
(C) second or seventh
(D) fifth or sixth
(E) sixth or seventh

4. If the ventriloquist appears fifth and the hypnotist appears sixth, which of the following must be true?

(A) The guitarist appears either third or seventh.
(B) The magician appears either second or third.
(C) The pianist appears either second or fourth.
(D) The singer appears either second or seventh.
(E) The singer appears either third or fourth.

5. If the hypnotist appears sixth and the magician appears seventh, which of the following must be true?

(A) The ventriloquist appears third or fourth.
(B) The singer appears fourth or fifth.
(C) The juggler immediately precedes the pianist.
(D) The pianist immediately precedes the guitarist.
(E) The singer immediately precedes the hypnotist.

6. What is the total number of different time slots into any one of which the singer can be scheduled?

(A) 3
(B) 4
(C) 5
(D) 6
(E) 7

7. If all of the performers requiring musical accompaniment appear before the magician, who appears sixth, each of the following could be true EXCEPT that the

(A) guitarist appears fifth
(B) hypnotist appears fourth
(C) pianist appears second
(D) singer appears fourth
(E) ventriloquist appears third

GO ON TO THE NEXT PAGE.

8. The equity for women bill was narrowly defeated several times in a country's legislature. Thirty-three votes were required for passage. Thirty-two members of the legislature voted for the bill in 1985, whereas only 30 legislators voted for it in 1987. This was true even though no legislators changed their votes.

   Which of the following, if true, best explains why the number of votes for the bill changed from 32 in 1985 to 30 in 1987 ?

   (A) In 1985 the effort to pass the bill was led by an influential, experienced legislator, whereas in 1987 the effort was led by a little-known, inexperienced legislator.
   (B) There was an election in 1986 in which two legislators who supported the bill lost their seats in the legislature and no one who supported the bill was newly elected.
   (C) There was an election in 1986 in which a party leader who did not support the bill was reelected and the party that was in power lost a seat in the legislature.
   (D) In 1986 an organization that opposed the bill mounted an extensive lobbying campaign to persuade legislators to vote against it.
   (E) Several provisions of the bill were rewritten between 1985 and 1987 in such a way that the bill's coverage was expanded considerably.

9. Tinea is a skin infection caused by certain fungi. A significant fraction of the people who contract tinea have outbreaks of its symptoms again and again. This proves that, for each of these individuals, the original case of tinea was, in fact, never completely cured.

   The argument above assumes that a person who has outbreaks of tinea symptoms again and again

   (A) can never be completely cured of tinea
   (B) does not understand what causes tinea
   (C) did not get medical treatment for the original case of tinea
   (D) did not take steps to avoid contracting tinea
   (E) has not been repeatedly infected with tinea

10. Computer programs are unusual in that they are virtually the only products that have been protected both by patent and by copyright. Patents protect the idea behind an innovation, whereas copyrights protect the expression of that idea. However, in order to win either protection, the idea must be clearly distinguished from its expression.

    Which of the following can be properly inferred from the statements above?

    (A) The idea behind some computer programs can be distinguished from the expression of that idea.
    (B) Anyone who writes a computer program is the inventor of the idea of that program.
    (C) Most products that are copyrighted are expressions of ideas that are patented.
    (D) Few inventors are owners of both patents and copyrights.
    (E) A patent for a computer program is no more difficult to win than a copyright.

GO ON TO THE NEXT PAGE.

Questions 11-16

A certain kind of traditional cloth is woven from as many as seven colors of yarn: blue, green, orange, purple, red, white, and yellow. Each piece is woven with a background of exactly one color; and either a human figure or a bird figure, or both, are woven into each piece. The following additional restrictions apply to the use of colors:

Each figure must include at least three colors.
The color used for the background of a piece cannot be used in any figures on that piece.
Any two figures on a single piece can have at most two colors in common.
Neither blue nor purple can be used in bird figures.
If green is used in a figure, both white and yellow must be used in that figure.

11. For a piece with a red background and only a human figure, which of the following could be a complete and accurate list of the colors that are used in the figure?

(A) Blue and purple
(B) Blue, red, and yellow
(C) Orange, white, and yellow
(D) Blue, purple, green, and orange
(E) Orange, purple, green, and white

12. For a piece with a white background and a bird figure only, which of the following must be the colors used in the figure?

(A) Blue, green, and orange
(B) Green, orange, and yellow
(C) Orange, red, and yellow
(D) Purple, red, and white
(E) Red, white, and yellow

13. For a piece with two figures that have exactly one color in common, that color could be any of the following EXCEPT

(A) blue
(B) orange
(C) red
(D) white
(E) yellow

14. For a piece with both a human figure and a bird figure, if the background is orange and the human figure includes green, then the bird figure must be which of the following colors?

(A) Blue, green, and white
(B) Blue, purple, and orange
(C) Green, white, and yellow
(D) Orange, red, and yellow
(E) Red, white, and yellow

15. A piece with two figures must be woven of yarn of at least how many colors?

(A) 3
(B) 4
(C) 5
(D) 6
(E) 7

16. For a piece with two figures that have no colors in common, the background CANNOT be which of the following colors?

(A) Blue
(B) Green
(C) Purple
(D) Red
(E) White

GO ON TO THE NEXT PAGE.

Questions 17-22

In a large factory there are exactly seven supervisors of operations—F, G, H, J, K, M, and N. These supervisors communicate with each other in two ways: through a message circuit and by two-way radio.

Messages can be sent in only one direction along the message circuit from F to G, from G to J, from J to M, from M to N, and from N to F.
Messages can be sent in either direction by two-way radio between G and H, between H and N, and between J and K.

No other routes of communication are available for sending messages among the seven supervisors. Messages that cannot be sent directly to the intended supervisor are sent through one or more intermediaries, who pass the messages along a possible route. Any supervisor, but only a supervisor, can be an intermediary.

17. A message from the first to the second supervisor in which of the following pairs can be sent using exactly one intermediary?

(A) F to M
(B) H to F
(C) J to G
(D) K to H
(E) N to K

18. Sending a message from the first to the second supervisor in which of the following pairs requires using both the message circuit and the two-way radio?

(A) F to M
(B) H to N
(C) J to H
(D) K to J
(E) N to G

19. Sending a message from the first to the second supervisor in which of the following pairs requires a minimum of two intermediaries?

(A) F to K
(B) G to N
(C) H to J
(D) J to K
(E) M to H

20. A message from G to F must be sent through

(A) H
(B) J
(C) K
(D) M
(E) N

21. A message originating from which of the following supervisors requires the use of both the message circuit and the two-way radio if the message is to reach more than one supervisor?

(A) F
(B) G
(C) J
(D) K
(E) N

22. A message sent through the fewest possible intermediaries from the first to the second supervisor in which of the following pairs requires exactly three intermediaries?

(A) F to N
(B) H to M
(C) J to H
(D) K to G
(E) N to K

GO ON TO THE NEXT PAGE.

23. Over several months new residents of a housing development complained to their town council about unpleasant barnyard odors from a nearby farm. The council concluded that, because the residents were not used to rural life, they had mistakenly identified as a barnyard odor the smell of the town's new leaf-composting pile, located on a site adjacent to the farm.

Which of the following, if true, would most seriously weaken the town council's conclusion?

(A) No one else in the town had complained of unpleasant odors from the farm.
(B) Some of the new residents had moved to this town in order to lead a more rural life.
(C) The new residents' complaints started before the establishment of the town's leaf-composting pile.
(D) Leaf-composting piles produce unpleasant odors even if they are properly managed.
(E) The farm was selected as the location for the leaf-composting pile before the housing development was built.

24. A three-hour movie replaced three regularly scheduled television programs. The movie had only two equally long breaks for advertisements instead of the five equal breaks that normally interrupted the regular programs. However, the total time used for advertisements during the movie equaled the time usually used for advertisements during the regular programs.

If the statements above are true, which of the following must also be true?

(A) The average length of the advertisements shown during the movie was shorter than that of the advertisements usually shown during the regular programs.
(B) Only one sponsor's advertisements were shown during the movie, whereas more than one sponsor's advertisements were shown during the regular programs.
(C) The sponsors who advertised during the movie were not the same as the sponsors who usually advertised during the regular programs.
(D) Each of the interruptions for advertisements in the movie was longer than each of the interruptions for advertisements that usually occurred in the regular programs.
(E) The advertisements during the movie focused on only one kind of product, whereas the advertisements during the regular programs focused on a variety of products.

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25. In the 1980's billions of batteries were thrown into landfills. There is growing concern that as the batteries deteriorate, the toxic metals they contain will seep into the groundwater and contaminate it. That concern is unfounded, however, for studies of groundwater near large landfills used in the 1950's and then closed showed little, if any, such contamination.

Which of the following, if true, most seriously weakens the argument above?

(A) Compared to typical 1980's landfills, typical 1950's landfills contain a negligible number of batteries.
(B) In the 1950's batteries contained higher amounts of toxic metals than they did in the 1980's.
(C) In the 1950's incinerator ash dumped in landfills contained more toxic material from batteries than did such ash in the 1980's.
(D) Batteries manufactured in the 1980's were less likely to leak fluids containing toxic metals than were 1950's batteries.
(E) In the 1980's efforts to recycle the toxic metals contained in batteries increased substantially.

SECTION 4

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

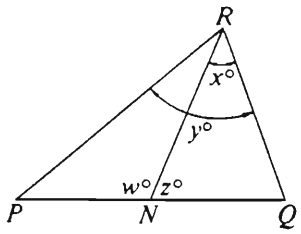
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

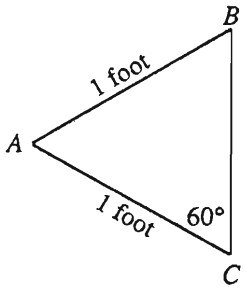


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	$2\left(\frac{1}{3}\right)$	$\frac{2}{\frac{1}{3}}$



	Column A	Column B
2.	The perimeter of flat, triangular game board ABC	3 feet

The cost of strawberries is \$0.45 per pint if picked by the customer and \$1.25 per quart already picked. (2 pints = 1 quart)

	Column A	Column B
3.	The cost of 8 quarts of strawberries picked by the customer	The cost of 6 quarts of strawberries already picked

x and y are positive integers and their sum is 13.

	Column A	Column B
4.	x	12

	Column A	Column B
5.	The remainder when a positive odd integer is divided by 2	The remainder when a positive even integer is divided by 2

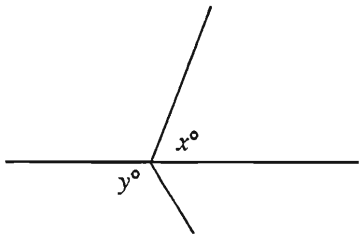
$x \neq 0$

	Column A	Column B
6.	$\frac{2+x}{2}$	$\frac{2+x}{x}$

	Column A	Column B
7.	$-(\lvert 5\rvert + \lvert -5\rvert)$	0

$2 > 3a > 0$

	Column A	Column B
8.	a	a^2



	Column A	Column B
9.	$x + y$	180

	Column A	Column B
10.	The total surface area of a rectangular solid with length 6, width 4, and height 5	120

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Column A	Column B

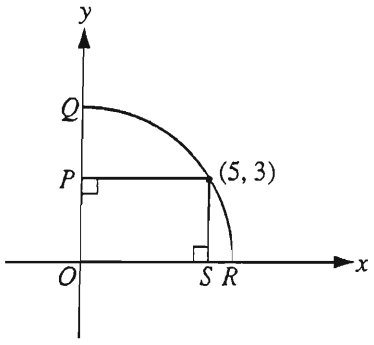
Questions 11-12 refer to the following definition.

For any non-negative integer n, let $n^{\diamond} = n + 1$.

11.	$\left(\frac{8}{2}\right)^{\diamond}$	$\frac{8^{\diamond}}{2^{\diamond}}$

a and b are non-negative integers.

12.	$(a + b)^{\diamond}$	$a + b^{\diamond}$



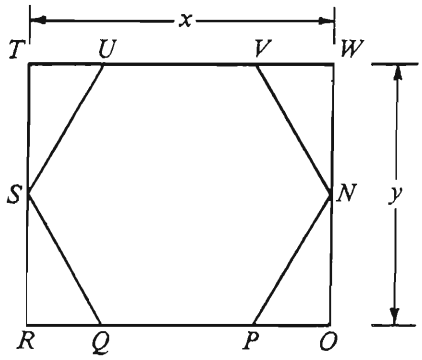
QR is the arc of a circle that has center O.

13.	$PQ - SR$	2

Column A	Column B

In each of the years 1983 and 1984, the total number of automobiles sold in the United States was 1.2 million more than in the previous year.

14.	Percent increase in the number of automobiles sold in 1983 over 1982	Percent increase in the number of automobiles sold in 1984 over 1983



Polygon $SUVNPQ$ is equilateral and equiangular and $TWOR$ is a rectangle.

15.	$\frac{x}{y}$	1

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Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

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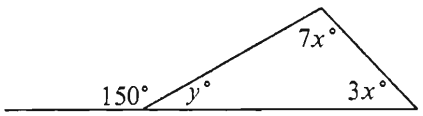
16. $\frac{3.81}{0.185}$ is closest to

(A) 2,000
(B) 200
(C) 20
(D) 2
(E) 0.2



17. In the triangle above, the measure of the smallest angle is

(A) 15°
(B) 30°
(C) 45°
(D) 55°
(E) 60°

18. If the price of a certain stock increased by 40 percent to \$14.00, what was the price of the stock before the increase?

(A) \$10.00
(B) \$9.60
(C) \$8.40
(D) \$7.20
(E) \$5.60

19. Which of the following expresses the perimeter of a square region in terms of its area K?

(A) $4K$
(B) $2\sqrt{K}$
(C) $\sqrt{2K}$
(D) $4\sqrt{K}$
(E) $4K\sqrt{K}$

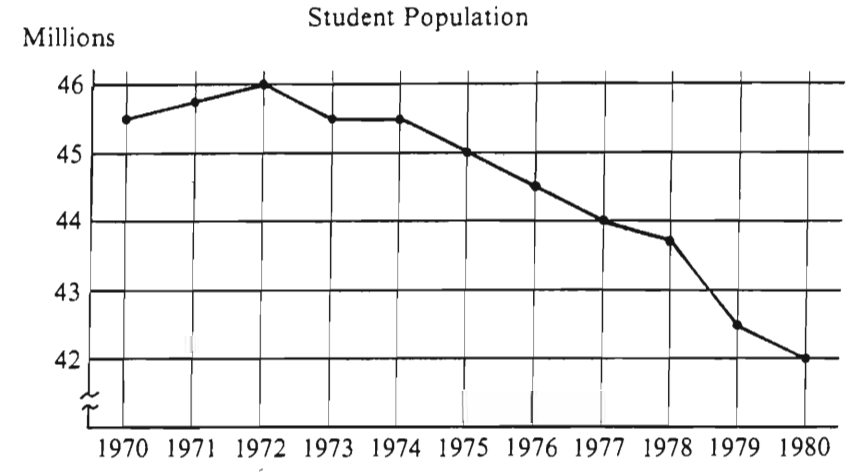
20. If x is an odd integer, for which of the following equations must y be an even integer?

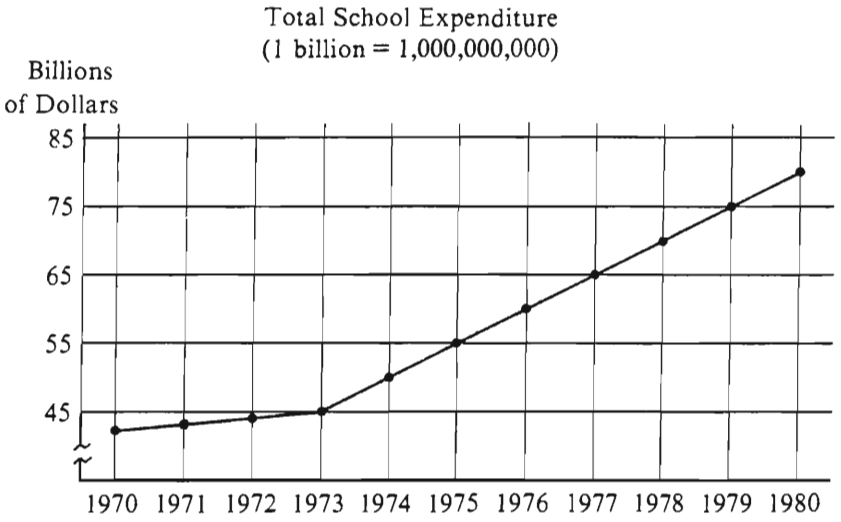
(A) $xy = 5$
(B) $x + y = 8$
(C) $x + 2y = 7$
(D) $2(x + y) = 7$
(E) $2x + y = 6$

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graphs.

STUDENT POPULATION AND TOTAL SCHOOL EXPENDITURE IN THE UNITED STATES, 1970-1980





Note: Drawn to scale.

GO ON TO THE NEXT PAGE.

21. For how many of the years shown did the student population change by 1 million or more from the previous year?

(A) None
(B) One
(C) Two
(D) Three
(E) Four

22. The per student expenditure in 1980 was approximately

(A) $5,000
(B) $2,000
(C) $1,500
(D) $1,000
(E) $500

23. Which of the following can be inferred from the graphs?

I. The per student expenditure was the same for 1973 and 1974.
II. The per student expenditure was greatest in 1972.
III. The student population decreased at a greater rate from 1978 to 1980 than from 1976 to 1978.

(A) I only
(B) II only
(C) III only
(D) I and II only
(E) I, II, and III

24. The percent increase in total school expenditures from 1973 to 1980 was approximately

(A) 35%
(B) 45%
(C) 55%
(D) 80%
(E) 130%

25. What was the average (arithmetic mean) decline per year in student population from 1972 to 1980 ?

(A) 350,000
(B) 364,000
(C) 400,000
(D) 444,000
(E) 500,000

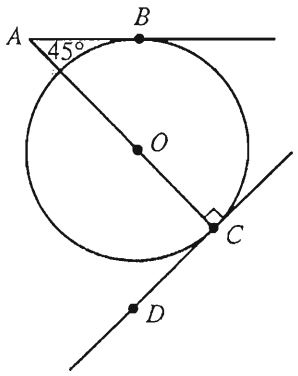
GO ON TO THE NEXT PAGE.

26. A certain computer program generates a sequence of numbers $P_1, P_2, \ldots, P_n$ by the rules $P_1 = 1$, $P_2 = 1$, and for $n \geq 3$, $P_n = P_{n-1} + 2P_{n-2}$. Which of the following equals P_5?

(A) 10
(B) 11
(C) 14
(D) 15
(E) 17

27. The roots of the equation $x^2 - x - 6 = 0$ are

(A) 1 and -5
(B) 2 and -3
(C) 3 and -2
(D) 5 and -1
(E) none of the above



28. In the figure above, O is the center of the circle. Line AB intersects the circle only at point B, and line DC intersects the circle only at point C. If the circle has a radius of 2, then $AC =$

(A) 4
(B) $2\sqrt{2}$
(C) $4 + \sqrt{2}$
(D) $4 + \sqrt{3}$
(E) $2 + 2\sqrt{2}$

29. If $x^2 - y^2 = 1$ and the average (arithmetic mean) of x and y is 4, what is the value of $x - y$?

(A) $\frac{1}{8}$
(B) $\frac{1}{4}$
(C) $\frac{1}{2}$
(D) 2
(E) 4

30. At the rate of $\frac{x}{6}$ miles for every y seconds, how many miles can an aircraft travel in z minutes? $(xyz \neq 0)$

(A) $\frac{xy}{6z}$
(B) $\frac{xz}{6y}$
(C) $\frac{xyz}{6}$
(D) $\frac{10xy}{z}$
(E) $\frac{10xz}{y}$

SECTION 5

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Nearly two-thirds of the country's mushroom crop is produced by 160 growers in a single county, the greatest ------- growers anywhere.

   (A) cause of
   (B) agreement among
   (C) indication of
   (D) interaction between
   (E) concentration of

2. The disjunction between educational objectives that stress independence and individuality and those that emphasize obedience to rules and cooperation with others reflects a ------- that arises from the values on which these objectives are based.

   (A) conflict (B) redundancy (C) gain
   (D) predictability (E) wisdom

3. It is ------- for a government to fail to do whatever it can to eliminate a totally ------- disease.

   (A) folly. .innocuous
   (B) irresponsible. .preventable
   (C) crucial. .fatal
   (D) instinctive. .devastating
   (E) detrimental. .insignificant

4. Dramatic literature often ------- the history of a culture in that it takes as its subject matter the important events that have shaped and guided the culture.

   (A) confounds (B) repudiates (C) recapitulates
   (D) anticipates (E) polarizes

5. The legislators of 1563 realized the ------- of trying to regulate the flow of labor without securing its reasonable remuneration, and so the second part of the statute dealt with establishing wages.

   (A) intricacy (B) anxiety (C) futility
   (D) necessity (E) decadence

6. Scientists who are on the cutting edge of research must often violate common sense and make seemingly ------- assumptions because existing theories simply do not ------- newly observed phenomena.

   (A) radical. .confirm
   (B) vague. .incorporate
   (C) absurd. .explain
   (D) mistaken. .reveal
   (E) inexact. .corroborate

7. The ------- with which the French aristocracy greeted the middle-class Rousseau was all the more ------- because he showed so little respect for them.

   (A) deference. .remarkable
   (B) suspicion. .uncanny
   (C) reserve. .unexpected
   (D) anger. .ironic
   (E) appreciation. .deserved

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. BRUSH : PAINTING ::
   (A) piano : sonata
   (B) body : dance
   (C) typewriter : novel
   (D) chisel : sculpture
   (E) voice : soliloquy

9. DECIBEL : SOUND ::
   (A) volt : electricity
   (B) odometer : distance
   (C) radius : circle
   (D) color : light
   (E) wavelength : spectrum

10. DIPLOMAT : TACT ::
    (A) administrator : education
    (B) merchant : catalog
    (C) politician : flamboyance
    (D) inventor : ingenuity
    (E) accountant : flexibility

11. ATTORNEY : DISBAR ::
    (A) monarch : abdicate
    (B) emissary : debrief
    (C) officer : demote
    (D) landlord : evict
    (E) student : expel

12. DIRGE : MUSIC ::
    (A) fable : narrative
    (B) elegy : poetry
    (C) violin : strings
    (D) rhyme : tone
    (E) heroine : character

13. LOG : SHIP ::
    (A) archive : data
    (B) inventory : store
    (C) roster : team
    (D) bulletin : event
    (E) diary : person

14. APOLOGIZE : CONTRITE ::
    (A) aggravate : contemptuous
    (B) endorse : esteemed
    (C) extenuate : guilty
    (D) compliment : impressed
    (E) rationalize : modest

15. EUPHEMISM : OFFENSE ::
    (A) rhetoric : persuasion
    (B) prevarication : truth
    (C) metaphor : description
    (D) repetition : boredom
    (E) conciliation : appeasement

16. SENSITIZATION : ALLERGIC ::
    (A) immunity : vulnerable
    (B) habituation : inured
    (C) invigoration : stimulating
    (D) sleep : anesthetic
    (E) disinfection : preventive

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Some recent historians have argued that life in the British colonies in America from approximately 1763 to 1789 was marked by internal conflicts among colonists. Inheritors of some of the viewpoints of early twentieth-century Progressive historians such as Beard and Becker, these recent historians have put forward arguments that deserve evaluation.

The kind of conflict most emphasized by these historians is class conflict. Yet with the Revolutionary War dominating these years, how does one distinguish class conflict within that larger conflict? Certainly not by the side a person supported. Although many of these historians have accepted the earlier assumption that Loyalists represented an upper class, new evidence indicates that Loyalists, like rebels, were drawn from all socioeconomic classes. (It is nonetheless probably true that a larger percentage of the well-to-do joined the Loyalists than joined the rebels.) Looking at the rebel side, we find little evidence for the contention that lower-class rebels were in conflict with upper-class rebels. Indeed, the war effort against Britain tended to suppress class conflicts. Where it did not, the disputing rebels of one or another class usually became Loyalists. Loyalism thus operated as a safety valve to remove socioeconomic discontent that existed among the rebels. Disputes occurred, of course, among those who remained on the rebel side, but the extraordinary social mobility of eighteenth-century American society (with the obvious exception of slaves) usually prevented such disputes from hardening along class lines. Social structure was in fact so fluid—though recent statistics suggest a narrowing of economic opportunity as the latter half of the century progressed—that to talk about social classes at all requires the use of loose economic categories such as rich, poor, and middle class, or eighteenth-century designations like "the better sort." Despite these vague categories, one should not claim unequivocally that hostility between recognizable classes cannot be legitimately observed. Outside of New York, however, there were very few instances of openly expressed class antagonism.

Having said this, however, one must add that there is much evidence to support the further claim of recent historians that sectional conflicts were common between 1763 and 1789. The "Paxton Boys" incident and the Regulator movement are representative examples of the widespread, and justified, discontent of western settlers against colonial or state governments dominated by eastern interests. Although undertones of class conflict existed beneath such hostility, the opposition was primarily geographical. Sectional conflict—which also existed between North and South—deserves further investigation.

In summary, historians must be careful about the kind of conflict they emphasize in eighteenth-century America. Yet those who stress the achievement of a general consensus among the colonists cannot fully understand that consensus without understanding the conflicts that had to be overcome or repressed in order to reach it.

17. The author considers the contentions made by the recent historians discussed in the passage to be
    (A) potentially verifiable
    (B) partially justified
    (C) logically contradictory
    (D) ingenious but flawed
    (E) capricious and unsupported

18. The author most likely refers to "historians such as Beard and Becker" (lines 5-6) in order to
    (A) isolate the two historians whose work is most representative of the viewpoints of Progressive historians
    (B) emphasize the need to find connections between recent historical writing and the work of earlier historians
    (C) make a case for the importance of the views of the Progressive historians concerning eighteenth-century American life
    (D) suggest that Progressive historians were the first to discover the particular internal conflicts in eighteenth-century American life mentioned in the passage
    (E) point out historians whose views of history anticipated some of the views of the recent historians mentioned in the passage

GO ON TO THE NEXT PAGE.

19. According to the passage, Loyalism during the American Revolutionary War served the function of

(A) eliminating the disputes that existed among those colonists who supported the rebel cause
(B) drawing upper, as opposed to lower, socio-economic classes away from the rebel cause
(C) tolerating the kinds of socioeconomic discontent that were not allowed to exist on the rebel side
(D) channeling conflict that existed within a socio-economic class into the war effort against the rebel cause
(E) absorbing members of socioeconomic groups on the rebel side who felt themselves in contention with members of other socioeconomic groups

20. The passage suggests that the author would be likely to agree with which of the following statements about the social structure of eighteenth-century American society?

I. It allowed greater economic opportunity than it did social mobility.
II. It permitted greater economic opportunity prior to 1750 than after 1750.
III. It did not contain rigidly defined socioeconomic divisions.
IV. It prevented economic disputes from arising among members of the society.

(A) I and IV only
(B) II and III only
(C) III and IV only
(D) I, II, and III only
(E) I, II, III, and IV

21. It can be inferred from the passage that the author would be most likely to agree with which of the following statements regarding socioeconomic class and support for the rebel and Loyalist causes during the American Revolutionary War?

(A) Identifying a person's socioeconomic class is the least accurate method of ascertaining which side that person supported.
(B) Identifying a person as a member of the rebel or of the Loyalist side does not necessarily reveal that person's particular socioeconomic class.
(C) Both the rebel and the Loyalist sides contained members of all socioeconomic classes, although there were fewer disputes among socioeconomic classes on the Loyalist side.
(D) Both the rebel and the Loyalist sides contained members of all socioeconomic classes, although the Loyalist side was made up primarily of members of the upper classes.
(E) Both the rebel and the Loyalist sides contained members of all socioeconomic classes, although many upper-class rebels eventually joined the Loyalists.

22. The author suggests which of the following about the representativeness of colonial or state governments in America from 1763 to 1789 ?

(A) The governments inadequately represented the interests of people in western regions.
(B) The governments more often represented class interests than sectional interests.
(C) The governments were less representative than they had been before 1763.
(D) The governments were dominated by the interests of people of an upper socioeconomic class.
(E) The governments of the northern colonies were less representative than were the governments of the southern colonies.

23. According to the passage, which of the following is a true statement about sectional conflicts in America between 1763 and 1789 ?

(A) These conflicts were instigated by eastern interests against western settlers.
(B) These conflicts were the most serious kind of conflict in America.
(C) The conflicts eventually led to openly expressed class antagonism.
(D) These conflicts contained an element of class hostility.
(E) These conflicts were motivated by class conflicts.

GO ON TO THE NEXT PAGE.

Since 1953, many experimental attempts to synthesize the chemical constituents of life under "primitive Earth conditions" have been performed, but none of these experiments has produced anything approaching the complexity of the simplest organism. They have demonstrated, however, that a variety of the complex molecules currently making up living organisms could have been present in the early ocean and atmosphere, with only one limitation: such molecules are synthesized far less readily when oxygen-containing compounds dominate the atmosphere. Therefore some scientists postulate that the Earth's earliest atmosphere, unlike that of today, was dominated by hydrogen, methane, and ammonia.

From these studies, scientists have concluded that the surface of the primitive Earth was covered with oceans containing the molecules fundamental to life. Although, at present, scientists cannot explain how these relatively small molecules combined to produce larger, more complex molecules, some scientists have precipitously ventured hypotheses that attempt to explain the development, from these larger molecules, of the earliest self-duplicating organisms.

24. According to the passage, which of the following can be inferred about the process by which the chemical constituents of life were synthesized under primitive Earth conditions?

(A) The synthesis is unlikely to occur under current atmospheric conditions.
(B) The synthesis is common in modern laboratories.
(C) The synthesis occurs more readily in the atmosphere than in the ocean.
(D) The synthesis easily produces the most complex organic molecules.
(E) The synthesis is accelerated by the presence of oxygen-containing compounds.

25. The primary purpose of the passage is to

(A) point out that theories about how life developed on Earth have changed little since 1953
(B) warn of increasing levels of hydrogen, methane, and ammonia in the Earth's atmosphere
(C) describe the development since 1953 of some scientists' understanding of how life began on Earth
(D) demonstrate that the synthesis of life in the laboratory is too difficult for modern technology
(E) describe how primitive atmospheric conditions produced the complex molecules of living organisms

26. It can be inferred from the passage that "some scientists" assume which of the following concerning "larger, more complex molecules" (line 20) ?

(A) The earliest atmosphere was formed primarily of these molecules.
(B) Chemical processes involving these molecules proceeded much more slowly under primitive Earth conditions.
(C) The presence of these molecules would necessarily precede the existence of simple organisms.
(D) Experimental techniques will never be sufficiently sophisticated to produce in the laboratory simple organisms from these chemical constituents.
(E) Explanations could easily be developed to explain how simple molecules combined to form these more complex ones.

27. The author's reaction to the attempts that have been made to explain the development of the first self-duplicating organisms can best be described as one of

(A) enthusiasm (B) expectation (C) dismay
(D) skepticism (E) antipathy

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. MINIMIZE: (A) report (B) imagine (C) repair (D) overestimate (E) investigate

29. VARIATION: (A) uniformity (B) equivalence (C) parallelism (D) comparison (E) precision

30. DEFAULT: (A) budget one's time (B) pay one's debts (C) change one's opinion (D) keep one's temper (E) hoard one's resources

31. SUBSTANTIVE: (A) inelegant (B) casual (C) controversial (D) trivial (E) indirect

32. METEORIC: (A) skeptical (B) pessimistic (C) complacent (D) gradual (E) exemplary

33. CENSURE: (A) commend (B) trust (C) excite (D) perceive (E) console

34. INCHOATE: (A) obviously fictional (B) partially reliable (C) fully realized (D) suspended (E) operative

35. APOCRYPHA: (A) synopsis (B) dissertation (C) canon (D) disclosure (E) idolatry

36. ABSCISSION:
(A) process of grafting
(B) process of transforming
(C) state of fluctuation
(D) absence of contamination
(E) lack of coordination

37. EQUANIMITY: (A) uncharitableness (B) agitation (C) predisposition (D) disinterest (E) loquacity

38. ONEROUS: (A) popular (B) beneficial (C) calming (D) showing great consideration (E) requiring little effort

SECTION 7

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-7

An office building has exactly six floors, numbered 1 through 6 from bottom to top. Each of exactly six companies—F, G, I, J, K, and M—must be assigned an entire floor for office space. The floors must be assigned according to the following conditions:

F must be on a lower floor than G.
I must be either on the floor immediately above M's floor or on the floor immediately below M's floor.
J can be neither on the floor immediately above M's floor nor on the floor immediately below M's floor.
K must be on floor 4.

1. Which of the following is an acceptable assignment of companies to floors, in order from floor 1 through floor 6 ?

(A) F, I, G, K, J, M
(B) G, I, M, K, F, J
(C) J, F, G, K, I, M
(D) J, M, I, K, F, G
(E) K, F, J, G, M, I

2. If G is on floor 5, which of the following must be true?

(A) F is on floor 1.
(B) F is on floor 3.
(C) I is on floor 1.
(D) J is on floor 6.
(E) M is on floor 2.

3. If M is on floor 2, any of the following could be true EXCEPT:

(A) F is on floor 3.
(B) F is on floor 5.
(C) I is on floor 1.
(D) J is on floor 5.
(E) J is on floor 6.

4. If J is on floor 3, which of the following is a pair of companies that must be on floors one of which is immediately above the other?

(A) F and G
(B) F and K
(C) G and J
(D) I and J
(E) K and M

5. Each of the following is a pair of companies that could be on floors one of which is immediately above the other EXCEPT

(A) F and I
(B) F and M
(C) G and I
(D) I and K
(E) J and K

6. If F is on floor 5, which of the following must be true?

(A) I is on floor 2.
(B) I is on floor 3.
(C) J is on floor 1.
(D) J is on floor 2.
(E) M is on floor 3.

7. If F and I are on floors one of which is immediately above the other, which of the following could be on floors one of which is immediately above the other?

(A) F and J
(B) F and M
(C) G and M
(D) I and K
(E) J and K

GO ON TO THE NEXT PAGE.

I. From 1975 to 1985, the yearly level of polychlorinated biphenyls, or PCB's, to which the average person is exposed decreased significantly.

II. From 1975 to 1985, the incidence of disease caused by PCB exposure doubled from previous levels, which were already high. This was true even for the group of people whose exposure was average for each year during that period.

8. Which of the following, if true, would best resolve the apparent contradiction between statement I and statement II above?

(A) The diseases caused by PCB's are not very severe.
(B) PCB's are not easily destroyed by environmental forces.
(C) From 1965 to 1975, the average level of exposure to PCB's also decreased.
(D) Between 1985 and the present, the average level of exposure to PCB's increased to pre-1975 levels.
(E) The time between the period of exposure to PCB's and the onset of diseases caused by such exposure is often longer than 10 years.

9. Plastic has been replacing aluminum in a widening array of military equipment because it offers equal protection at less weight. A plastic-armored vehicle is, however, twice as costly to make as an aluminum-armored vehicle. Therefore, the replacement of aluminum-armored vehicles by plastic-armored vehicles that offer equal protection is not yet advisable from a financial point of view.

Which of the following, if true, casts most doubt on the conclusion above?

(A) A plastic-armored vehicle could be operated at one-third the current cost of operating an aluminum-armored vehicle.
(B) The introduction of plastic-armored vehicles would require the military to retrain maintenance personnel and to purchase new tools and parts.
(C) The aluminum-armored vehicle is the least costly to maintain of all the metal-armored vehicles currently used by the military.
(D) Although the cost of plastic is expected to remain stable, the growing practice of recycling metals will probably drive down the cost of metals.
(E) The cost of repairing body damage on plastic-armored vehicles would exceed what the military currently spends to repair body damage on aluminum-armored vehicles.

10. Pandas are rapidly disappearing from the wild. Therefore, in order to preserve the species, existing pandas should be captured and placed in zoos around the world.

Which of the following statements, if true, casts most doubt on the conclusion drawn above?

(A) When in captivity, pandas typically produce more young than they do in their native habitat.
(B) Newborn pandas in zoos are not likely to die from infectious diseases, whereas newborn pandas in the wild are likely to die from these diseases.
(C) Sufficient quantities of bamboo, the panda's only food, cannot be made available outside the panda's native habitat.
(D) Many zoos are eager to increase their stock of rare and exotic animals, but there are not enough pandas for all the zoos that want one.
(E) Pandas in zoos have as many offspring that survive to adulthood as do pandas in the wild.

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Questions 11-14

Exactly four young wood-carvers are to attend a wood-carving workshop. The four are to be chosen from a group of seven eligible wood-carvers: three boys—Frank, George, and Harold—and four girls—Juanita, Karla, Mona, and Nellie. The four are to be chosen according to the following conditions:

If either George or Harold attends the workshop, the other must also attend.
Juanita and Karla cannot both attend the workshop.
George and Mona cannot both attend the workshop.

11. Which of the following could be the group attending the workshop?

(A) Frank, George, Harold, Mona
(B) Frank, George, Karla, Nellie
(C) Frank, Karla, Mona, Nellie
(D) George, Juanita, Mona, Nellie
(E) Juanita, Karla, Mona, Nellie

12. If Frank and Juanita attend the workshop, which of the following pairs of wood-carvers could be the others attending?

(A) George and Karla
(B) George and Nellie
(C) Harold and Mona
(D) Karla and Mona
(E) Mona and Nellie

13. If Harold attends the workshop, which of the following CANNOT attend?

(A) Frank
(B) George
(C) Juanita
(D) Mona
(E) Nellie

14. If two wood-carvers of each sex attend the workshop, which of the following is one of the wood-carvers who must attend?

(A) Frank
(B) Harold
(C) Juanita
(D) Karla
(E) Mona

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Questions 15-18

Researchers are testing numerous water samples for the presence of three minerals—X, Y, and Z. Each sample contains one or more of the minerals, X, Y, and Z, but no other minerals. The tests available to the researchers and the results the tests produce are as follows:

If the sample contains X but not Y, test F gives a positive result. Test F gives a negative result otherwise.

If the sample contains X or Y or both, or if the sample has already been subjected to test F, test G gives a positive result. Test G gives a negative result otherwise.

If the sample contains Z and has already been subjected to test G, test H gives a positive result. Test H gives a negative result otherwise.

15. If a sample is subjected to test G and the result is negative, then of the three minerals, the sample must contain

(A) X only
(B) Z only
(C) X and Y only
(D) X and Z only
(E) Y and Z only

16. If researchers know that, of two samples, one contains X only and one contains Y only, but they need to determine which sample contains which mineral, they do so with the least amount of testing if they subject

(A) either sample to test F
(B) either sample to test G
(C) either sample to test H
(D) both samples to test F
(E) both samples to test G

17. Which of the following tests, if performed as specified, will give a result that in itself does NOT tell researchers anything about the mineral content of a sample?

(A) F, performed first
(B) G, performed first
(C) H, performed first
(D) F, performed after G
(E) G, performed after H

18. If a sample is subjected to the three tests in the order F, G, and H, and if only test G is positive, which of the following could be the sample's mineral content?

(A) X only
(B) Y only
(C) Z only
(D) X and Z only
(E) X, Y, and Z

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Questions 19-22

A foundation has appointed two review panels to consider all applications to the foundation for funding. The members of one review panel are Khan, Lewis, and Morán, and they judge the merits of the projects for which funding is sought. The members of the other panel are Wood, Xavier, and Young, and they judge each applicant's qualifications. An application for funding is approved if the combined vote-tallies from both panels yield a majority in favor; otherwise, the application is rejected. The following generalizations about the voting hold without exception:

Each of the six reviewers casts either a vote in favor of or else a vote against any application that is reviewed.
Khan, Lewis, and Morán do not all vote the same as one another on any application, nor do Wood, Xavier, and Young ever all vote the same as one another.
Khan's vote is the opposite of Xavier's vote on all applications.
Morán's vote is the same as Wood's vote on all applications.

19. Which of the following could be the distribution of votes on an application for funding?

	In Favor	Against
(A)	Khan	Lewis, Morán, Wood, Xavier, Young
(B)	Lewis, Morán	Khan, Wood, Xavier, Young
(C)	Khan, Lewis, Xavier	Morán, Wood, Young
(D)	Khan, Lewis, Young	Morán, Wood, Xavier
(E)	Lewis, Wood, Young	Khan, Morán, Xavier

20. If an application is to be approved, the vote of which of the following must be in favor?

(A) Khan
(B) Lewis
(C) Morán
(D) Xavier
(E) Young

21. On an application on which Khan's vote is the same as Lewis', the votes of which of the following two reviewers must be the same as each other?

(A) Khan and Wood
(B) Lewis and Morán
(C) Morán and Young
(D) Wood and Xavier
(E) Xavier and Young

22. If Xavier voted in favor of an application and total votes are tied, which of the following is a pair of reviewers whose votes must be different from each other?

(A) Khan and Lewis
(B) Khan and Wood
(C) Lewis and Xavier
(D) Morán and Young
(E) Wood and Xavier

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23. Scientists have found that inserting genes from a plant virus into the genes of a plant susceptible to that virus increases the plant's resistance to the virus. Because viral diseases account for a significant proportion of crop losses, such genetic alterations, even if carried out on only a modest scale, will significantly reduce crop losses.

Each of the following, if true, strengthens the conclusion above EXCEPT:

(A) In areas where two successive crops are raised per year, protecting the first crop from a virus will generally protect the second crop from that virus as well.
(B) By repeatedly attacking plants that are genetically altered to become virus-resistant, the virus often becomes less lethal to plants that are not genetically altered in that way.
(C) Plants that are genetically altered to become virus-resistant often pass virus-resistant genes on to their offspring.
(D) Plants that are made genetically resistant to one kind of virus often acquire resistance to related viral strains as well.
(E) Plants that are made genetically resistant to one kind of virus are then more susceptible to infection by unrelated viruses.

24. Inspection system X and inspection system Y, though based on different principles, each detect all product flaws, but they each also erroneously reject three percent of flawless products. Since false rejections are very costly, money will be saved by installing both systems, instead of either one or the other, and rejecting only products found flawed by both.

The argument above requires which of the following assumptions?

(A) The three percent of flawless products that system X rejects are not all the same products, piece for piece, that system Y erroneously rejects.
(B) It is less costly to accept a flawed product than to reject a flawless one.
(C) In their price range, systems X and Y are the least error-prone inspection systems on the market.
(D) Whichever system performs the second inspection needs to inspect only products not rejected by the first system.
(E) Any way of detecting flaws, other than by using either system X or system Y, requires complete disassembly of the products.

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25. The 1988 drought in North America was probably caused by shifts in the temperature patterns of large equatorial stretches of the Pacific Ocean. The drought, therefore, is not evidence for the hypothesis that a long-term global warming trend, allegedly caused by atmospheric pollutants such as carbon dioxide, is occurring.

Which of the following, if true, constitutes the best criticism of the argument above?

(A) Most pre-1988 droughts for which we have records were preceded by shifts in temperature patterns in the Pacific Ocean.
(B) There has been no warming trend in the United States over the last 100 years.
(C) The consequences of global warming occur long after the actual emission of pollutants into the atmosphere.
(D) Emissions of carbon dioxide gas into the atmosphere increased in 1988.
(E) A global warming trend could cause increases in the frequency and severity of shifts in temperature patterns in the Pacific Ocean.

FOR GENERAL TEST 26 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 2			Section 5		
Number	Answer	P+	Number	Answer	P+
1	B	96	1	E	94
2	E	88	2	A	91
3	C	79	3	B	87
4	B	72	4	C	76
5	A	82	5	C	71
6	D	58	6	C	63
7	E	63	7	A	58
8	B	70	8	D	85
9	D	77	9	A	77
10	A	76	10	D	70
11	C	67	11	E	76
12	A	57	12	B	61
13	E	56	13	E	67
14	B	38	14	D	38
15	D	30	15	B	30
16	C	15	16	B	23
17	A	60	17	B	58
18	B	79	18	E	30
19	E	40	19	E	37
20	A	47	20	B	33
21	D	55	21	B	41
22	E	43	22	A	53
23	D	61	23	D	44
24	E	24	24	A	67
25	E	54	25	C	56
26	D	24	26	C	49
27	C	58	27	D	45
28	D	91	28	D	97
29	B	78	29	A	85
30	D	79	30	B	82
31	D	65	31	D	76
32	E	60	32	D	52
33	C	43	33	A	48
34	B	48	34	C	48
35	C	38	35	C	24
36	C	33	36	A	32
37	A	25	37	B	27
38	B	17	38	E	29

QUANTITATIVE ABILITY					
Section 1			Section 4		
Number	Answer	P+	Number	Answer	P+
1	B	88	1	B	81
2	C	81	2	C	90
3	A	86	3	B	90
4	B	76	4	D	83
5	D	80	5	A	82
6	A	65	6	D	67
7	C	60	7	B	72
8	A	65	8	A	61
9	D	51	9	D	58
10	D	52	10	A	48
11	A	47	11	A	51
12	B	39	12	C	37
13	C	38	13	C	43
14	C	29	14	A	46
15	D	20	15	A	26
16	C	88	16	C	78
17	D	70	17	B	82
18	A	87	18	A	72
19	B	55	19	D	61
20	E	73	20	E	52
21	B	90	21	B	86
22	E	87	22	B	73
23	A	83	23	C	84
24	C	58	24	D	56
25	D	40	25	E	55
26	A	57	26	B	42
27	B	58	27	C	52
28	D	33	28	E	35
29	D	33	29	A	27
30	E	32	30	E	26

ANALYTICAL ABILITY					
Section 3			Section 7		
Number	Answer	P+	Number	Answer	P+
1	E	78	1	C	79
2	A	66	2	D	48
3	E	83	3	B	54
4	B	67	4	A	50
5	A	65	5	C	45
6	D	49	6	A	46
7	B	49	7	E	41
8	B	86	8	E	79
9	E	43	9	A	69
10	A	47	10	C	75
11	C	76	11	C	84
12	C	82	12	E	83
13	A	70	13	D	80
14	E	61	14	B	72
15	C	43	15	B	58
16	E	25	16	A	53
17	B	53	17	C	46
18	C	51	18	B	44
19	A	41	19	D	57
20	E	40	20	C	54
21	D	32	21	D	36
22	E	19	22	D	25
23	C	76	23	E	59
24	D	73	24	A	55
25	A	66	25	E	51

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 26 ONLY AND THE PERCENTS BELOW*

Raw Score	Verbal Scaled Score	Verbal % Below	Quantitative Scaled Score	Quantitative % Below	Analytical Scaled Score	Analytical % Below
71-76	800	99				
70	780	99				
69	770	99				
68	750	98				
67	740	98				
66	730	97				
65	720	96				
64	710	95				
63	700	94				
62	690	94				
61	680	93				
60	660	90	800	96		
59	650	88	800	96		
58	640	87	800	96		
57	630	85	790	95		
56	620	83	780	93		
55	610	82	770	92		
54	600	80	760	90		
53	580	75	750	88		
52	570	73	740	87		
51	560	71	730	85		
50	550	69	720	83	800	99
49	540	66	710	81	800	99
48	530	63	700	79	800	99
47	520	60	690	77	780	97
46	510	58	680	75	760	96
45	500	55	670	73	740	94
44	490	52	650	69	730	93
43	480	50	640	67	720	92
42	470	47	630	65	700	89
41	460	43	620	62	690	87
40	450	40	610	60	680	86

Raw Score	Verbal Scaled Score	Verbal % Below	Quantitative Scaled Score	Quantitative % Below	Analytical Scaled Score	Analytical % Below
39	440	37	600	58	670	84
38	420	31	590	56	650	80
37	410	28	580	53	640	78
36	410	28	570	51	630	75
35	400	25	560	49	620	73
34	390	23	550	46	600	67
33	380	20	540	44	590	65
32	370	18	520	39	580	62
31	360	15	510	37	560	56
30	350	13	500	34	550	53
29	340	11	490	32	540	50
28	330	9	480	30	520	45
27	320	8	470	28	510	42
26	310	7	450	23	490	37
25	310	7	440	21	480	33
24	300	5	430	19	470	30
23	290	4	410	16	450	26
22	280	3	400	14	430	22
21	270	2	390	12	420	19
20	270	2	370	10	400	16
19	260	2	360	8	390	14
18	250	1	340	6	370	11
17	240	1	330	5	360	9
16	230	1	310	3	340	7
15	220	1	300	3	330	6
14	210	1	280	2	310	4
13	210	1	270	1	300	3
12	200	1	260	1	290	3
11	200	1	240	1	280	2
10	200	1	220	1	260	1
9	200	1	210	1	250	1
8	200	1	200	1	230	1
7	200	1	200	1	220	1
6	200	1	200	1	210	1
0-5	200	1	200	1	200	1

*Percent scoring below the scaled score is based on the performance of 945,995 examinees who took the General Test between October 1, 1987, and September 30, 1990. This percent below information is used for score reports during the 1992-93 testing year.

TEST 27

SECTION 1

Time—30 minutes

38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Agronomists are increasingly worried about "desertification," the phenomenon that is turning many of the world's ------- fields and pastures into ------- wastelands, unable to support the people living on them.

   (A) fertile. .barren
   (B) productive. .blooming
   (C) arid. .thriving
   (D) poorest. .marginal
   (E) largest. .saturated

2. Old beliefs die hard: even when jobs became -------, the long-standing fear that unemployment could return at a moment's notice -------.

   (A) vacant. .perished
   (B) easier. .changed
   (C) plentiful. .persisted
   (D) protected. .subsided
   (E) available. .receded

3. Intellectual ------- and flight from boredom have caused him to rush pell-mell into situations that less ------- spirits might hesitate to approach.

   (A) restlessness. .adventurous
   (B) agitation. .passive
   (C) resilience. .quiescent
   (D) tranquillity. .versatile
   (E) curiosity. .lethargic

4. Science advances in ------- spiral in that each new conceptual scheme ------- the phenomena explained by its predecessors and adds to those explanations.

   (A) a discontinuous . . . decries
   (B) a repetitive. .vitiates
   (C) a widening. .embraces
   (D) an anomalous. .captures
   (E) an explosive. .questions

5. Politeness is not a ------- attribute of human behavior, but rather a central virtue, one whose very existence is increasingly being ------- by the faddish requirement to "speak one's mind."

   (A) superficial. .threatened
   (B) pervasive. .undercut
   (C) worthless. .forestalled
   (D) precious. .repudiated
   (E) trivial. .affected

6. The painting was larger than it appeared to be, for, hanging in a darkened recess of the chapel, it was ------- by the perspective.

   (A) improved
   (B) aggrandized
   (C) embellished
   (D) jeopardized
   (E) diminished

7. Because folk art is neither completely rejected nor accepted as an art form by art historians, their final evaluations of it necessarily remain -------.

   (A) arbitrary
   (B) estimable
   (C) orthodox
   (D) unspoken
   (E) equivocal

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. REFEREE : FIELD :: (A) scientist : results
(B) mediator : deadlock (C) gladiator : contest
(D) teacher : classroom (E) judge : courtroom

9. BLUSH : EMBARRASSMENT ::
(A) scream : anger (B) smile : pleasure
(C) laugh : outrage (D) love : sentimentality
(E) whine : indecision

10. TANGO : DANCE ::
(A) arabesque : theme
(B) tonality : instrumentation
(C) rhyme : pattern
(D) stanza : line
(E) elegy : poem

11. CELL : MEMBRANE ::
(A) door : jamb
(B) yard : sidewalk
(C) seed : hull
(D) head : halo
(E) mountain : clouds

12. HYMN : PRAISE :: (A) waltz : joy
(B) liturgy : rite (C) lullaby : child
(D) dirge : grief (E) prayer : congregation

13. EMOLLIENT : SOOTHE ::
(A) dynamo : generate
(B) elevation : level
(C) precipitation : fall
(D) hurricane : track
(E) negative : expose

14. IMPLACABLE : COMPROMISE ::
(A) perfidious : conspire
(B) irascible : avenge
(C) honest : swindle
(D) amenable : deceive
(E) hasty : prevail

15. MISANTHROPE : PEOPLE ::
(A) patriot : country
(B) reactionary : government
(C) curmudgeon : children
(D) xenophobe : strangers
(E) miscreant : dogma

16. MILK : EXTRACT :: (A) squander : enjoy
(B) exploit : utilize (C) research : investigate
(D) hire : manage (E) wheedle : flatter

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Many critics of Emily Brontë's novel *Wuthering Heights* see its second part as a counterpoint that comments on, if it does not reverse, the first part, where a "romantic" reading receives more confirmation. Seeing the two parts as a whole is encouraged by the novel's sophisticated structure, revealed in its complex use of narrators and time shifts. Granted that the presence of these elements need not argue an authorial awareness of novelistic construction comparable to that of Henry James, their presence does encourage attempts to unify the novel's heterogeneous parts. However, any interpretation that seeks to unify all of the novel's diverse elements is bound to be somewhat unconvincing. This is not because such an interpretation necessarily stiffens into a thesis (although rigidity in any interpretation of this or of any novel is always a danger), but because *Wuthering Heights* has recalcitrant elements of undeniable power that, ultimately, resist inclusion in an all-encompassing interpretation. In this respect, *Wuthering Heights* shares a feature of *Hamlet*.

17. According to the passage, which of the following is a true statement about the first and second parts of *Wuthering Heights*?
    (A) The second part has received more attention from critics.
    (B) The second part has little relation to the first part.
    (C) The second part annuls the force of the first part.
    (D) The second part provides less substantiation for a "romantic" reading.
    (E) The second part is better because it is more realistic.

18. Which of the following inferences about Henry James's awareness of novelistic construction is best supported by the passage?
    (A) James, more than any other novelist, was aware of the difficulties of novelistic construction.
    (B) James was very aware of the details of novelistic construction.
    (C) James's awareness of novelistic construction derived from his reading of Brontë.
    (D) James's awareness of novelistic construction has led most commentators to see unity in his individual novels.
    (E) James's awareness of novelistic construction precluded him from violating the unity of his novels.

19. The author of the passage would be most likely to agree that an interpretation of a novel should
    (A) not try to unite heterogeneous elements in the novel
    (B) not be inflexible in its treatment of the elements in the novel
    (C) not argue that the complex use of narrators or of time shifts indicates a sophisticated structure
    (D) concentrate on those recalcitrant elements of the novel that are outside the novel's main structure
    (E) primarily consider those elements of novelistic construction of which the author of the novel was aware

20. The author of the passage suggests which of the following about *Hamlet*?
    I. *Hamlet* has usually attracted critical interpretations that tend to stiffen into theses.
    II. *Hamlet* has elements that are not amenable to an all-encompassing critical interpretation.
    III. *Hamlet* is less open to an all-encompassing critical interpretation than is *Wuthering Heights*.
    IV. *Hamlet* has not received a critical interpretation that has been widely accepted by readers.
    (A) I only
    (B) II only
    (C) I and IV only
    (D) III and IV only
    (E) I, II, and III only

GO ON TO THE NEXT PAGE.

The determination of the sources of copper ore used in the manufacture of copper and bronze artifacts of Bronze Age civilizations would add greatly to our knowledge of cultural contacts and trade in that era. Researchers have analyzed artifacts and ores for their concentrations of elements, but for a variety of reasons, these studies have generally failed to provide evidence of the sources of the copper used in the objects. Elemental composition can vary within the same copper-ore lode, usually because of varying admixtures of other elements, especially iron, lead, zinc, and arsenic. And high concentrations of cobalt or zinc, noticed in some artifacts, appear in a variety of copper-ore sources. Moreover, the processing of ores introduced poorly controlled changes in the concentrations of minor and trace elements in the resulting metal. Some elements evaporate during smelting and roasting; different temperatures and processes produce different degrees of loss. Finally, flux, which is sometimes added during smelting to remove waste material from the ore, could add quantities of elements to the final product.

An elemental property that is unchanged through these chemical processes is the isotopic composition of each metallic element in the ore. Isotopic composition, the percentages of the different isotopes of an element in a given sample of the element, is therefore particularly suitable as an indicator of the sources of the ore. Of course, for this purpose it is necessary to find an element whose isotopic composition is more or less constant throughout a given ore body, but varies from one copper ore body to another or, at least, from one geographic region to another.

The ideal choice, when isotopic composition is used to investigate the source of copper ore, would seem to be copper itself. It has been shown that small but measurable variations occur naturally in the isotopic composition of copper. However, the variations are large enough only in rare ores; between samples of the common ore minerals of copper, isotopic variations greater than the measurement error have not been found. An alternative choice is lead, which occurs in most copper and bronze artifacts of the Bronze Age in amounts consistent with the lead being derived from the copper ores and possibly from the fluxes. The isotopic composition of lead often varies from one source of common copper ore to another, with variations exceeding the measurement error; and preliminary studies indicate virtually uniform isotopic composition of the lead from a single copper-ore source. While some of the lead found in an artifact may have been introduced from flux or when other metals were added to the copper ore, lead so added in Bronze Age processing would usually have the same isotopic composition as the lead in the copper ore. Lead isotope studies may thus prove useful for interpreting the archaeological record of the Bronze Age.

21. The primary purpose of the passage is to
    (A) discuss the techniques of analyzing lead isotope composition
    (B) propose a way to determine the origin of the copper in certain artifacts
    (C) resolve a dispute concerning the analysis of copper ore
    (D) describe the deficiencies of a currently used method of chemical analysis of certain metals
    (E) offer an interpretation of the archaeological record of the Bronze Age

22. The author first mentions the addition of flux during smelting (lines 18-21) in order to
    (A) give a reason for the failure of elemental composition studies to determine ore sources
    (B) illustrate differences between various Bronze Age civilizations
    (C) show the need for using high smelting temperatures
    (D) illustrate the uniformity of lead isotope composition
    (E) explain the success of copper isotope composition analysis

23. The author suggests which of the following about a Bronze Age artifact containing high concentrations of cobalt or zinc?
    (A) It could not be reliably tested for its elemental composition.
    (B) It could not be reliably tested for its copper isotope composition.
    (C) It could not be reliably tested for its lead isotope composition.
    (D) It could have been manufactured from ore from any one of a variety of sources.
    (E) It could have been produced by the addition of other metals during the processing of the copper ore.

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24. According to the passage, possible sources of the lead found in a copper or bronze artifact include which of the following?

I. The copper ore used to manufacture the artifact
II. Flux added during processing of the copper ore
III. Other metal added during processing of the copper ore

(A) I only
(B) II only
(C) III only
(D) II and III only
(E) I, II, and III

25. The author rejects copper as the "ideal choice" mentioned in line 33 because

(A) the concentration of copper in Bronze Age artifacts varies
(B) elements other than copper may be introduced during smelting
(C) the isotopic composition of copper changes during smelting
(D) among common copper ores, differences in copper isotope composition are too small
(E) within a single source of copper ore, copper isotope composition can vary substantially

26. The author makes which of the following statements about lead isotope composition?

(A) It often varies from one copper-ore source to another.
(B) It sometimes varies over short distances in a single copper-ore source.
(C) It can vary during the testing of artifacts, producing a measurement error.
(D) It frequently changes during smelting and roasting.
(E) It may change when artifacts are buried for thousands of years.

27. It can be inferred from the passage that the use of flux in processing copper ore can alter the lead isotope composition of the resulting metal EXCEPT when

(A) there is a smaller concentration of lead in the flux than in the copper ore
(B) the concentration of lead in the flux is equivalent to that of the lead in the ore
(C) some of the lead in the flux evaporates during processing
(D) any lead in the flux has the same isotopic composition as the lead in the ore
(E) other metals are added during processing

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. MUTTER: (A) please oneself
(B) resolve conflict (C) speak distinctly
(D) digress randomly (E) omit willingly

29. TRANSPARENT: (A) indelicate (B) neutral
(C) opaque (D) somber (E) tangible

30. ENSEMBLE: (A) complement (B) cacophony
(C) coordination (D) preface (E) solo

31. RETAIN: (A) allocate (B) distract
(C) relegate (D) discard (E) misplace

32. RADIATE: (A) approach (B) cool
(C) absorb (D) tarnish (E) vibrate

33. EPICURE:
(A) a person ignorant about art
(B) a person dedicated to a cause
(C) a person motivated by greed
(D) a person indifferent to food
(E) a person insensitive to emotions

34. PREVARICATION: (A) tact (B) consistency
(C) veracity (D) silence (E) proof

35. AMORTIZE:
(A) loosen
(B) denounce
(C) suddenly increase one's indebtedness
(D) wisely cause to flourish
(E) grudgingly make provision for

36. EMACIATION: (A) invigoration
(B) glorification (C) amelioration
(D) inundation (E) magnification

37. UNALLOYED: (A) destabilized
(B) unregulated (C) assimilated
(D) adulterated (E) condensed

38. MINATORY: (A) reassuring (B) genuine
(C) creative (D) obvious (E) awkward

SECTION 2

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

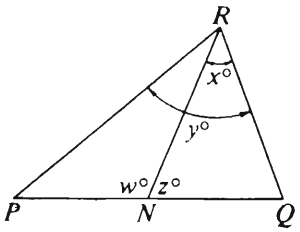
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

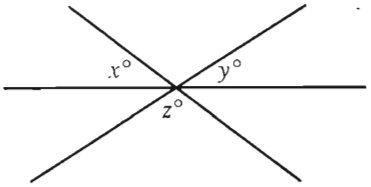
Examples 2-4 refer to $\triangle PQR$.

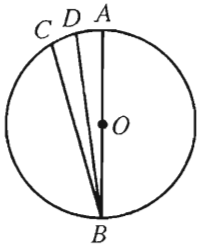
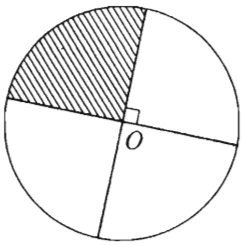


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
1.	$5[(2 + 2) + 5]$	50
2.	$j - k = 2$ $k - 6 = 4$ j	10
	Richard's salary, which is greater than \$10,000, is 75 percent of Sandra's salary. Ted's salary is 80 percent of Richard's salary.	
3.	Sandra's salary	Ted's salary
4.	$\frac{5}{3} \times 0.60$	1
5.	 $x + y$	$180 - z$
	On a trip, Marie drove 200 miles in 5 hours using gasoline that cost her \$1.49 per gallon.	
6.	Marie's average speed for the trip in miles per hour	Marie's gas mileage for the trip in miles per gallon
7.	$\sqrt{100 + 36}$	16
	The average (arithmetic mean) of 12 and 20 is equal to the average (arithmetic mean) of 15 and x.	
8.	x	16
	The total surface area of cube C equals 150.	
9.	The length of one edge of cube C	4.5
10.	$x + 32y$	$32x + y$

	Column A	Column B
	 O is the center of the circle.	
11.	AB	The average (arithmetic mean) of CB and DB
12.	$(x - 1)(x + 1)$	x^2
	 The circle has center O and radius 1.	
13.	The area of the shaded region	$\frac{\pi}{2}$
	The sum of the lengths of two sides of isosceles triangle K is 7. K has a side of length 4.	
14.	The perimeter of K	11
	S is the set of all fractions of the form $\frac{n}{n+1}$, where n is a positive integer less than 20.	
15.	The product of all the fractions that are in S	$\frac{1}{20}$

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Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. $\dfrac{5}{\frac{5}{4}} =$

(A) $\frac{1}{5}$

(B) $\frac{1}{4}$

(C) 4

(D) 5

(E) $\frac{25}{4}$

17. A 12-inch ruler is marked off in sixteenths of an inch. What is the distance, in inches, from the zero mark to the 111th mark after the zero mark?

(A) $6\frac{1}{4}$

(B) $6\frac{15}{16}$

(C) $7\frac{3}{4}$

(D) $9\frac{1}{4}$

(E) $11\frac{1}{16}$

18. If $(2x - 1)^2 = 0$, then $x =$

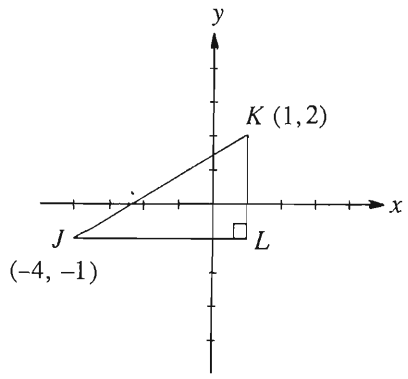
(A) $-\frac{1}{4}$

(B) $-\frac{1}{2}$

(C) 0

(D) $\frac{1}{2}$

(E) $\frac{1}{4}$



19. In the figure above, if JL and KL are parallel to the x and y axes, respectively, what is the area of $\triangle JKL$?

(A) 4.5
(B) 5
(C) 7.5
(D) 8
(E) 15

20. Which of the following is equal to 25,000,000 ?

(A) 25×10^7
(B) 2.5×10^{-7}
(C) $(2 \times 10^6) + (5 \times 10^5)$
(D) $(20 \times 10^{-7}) + (5 \times 10^{-6})$
(E) $(2 \times 10^7) + (5 \times 10^6)$

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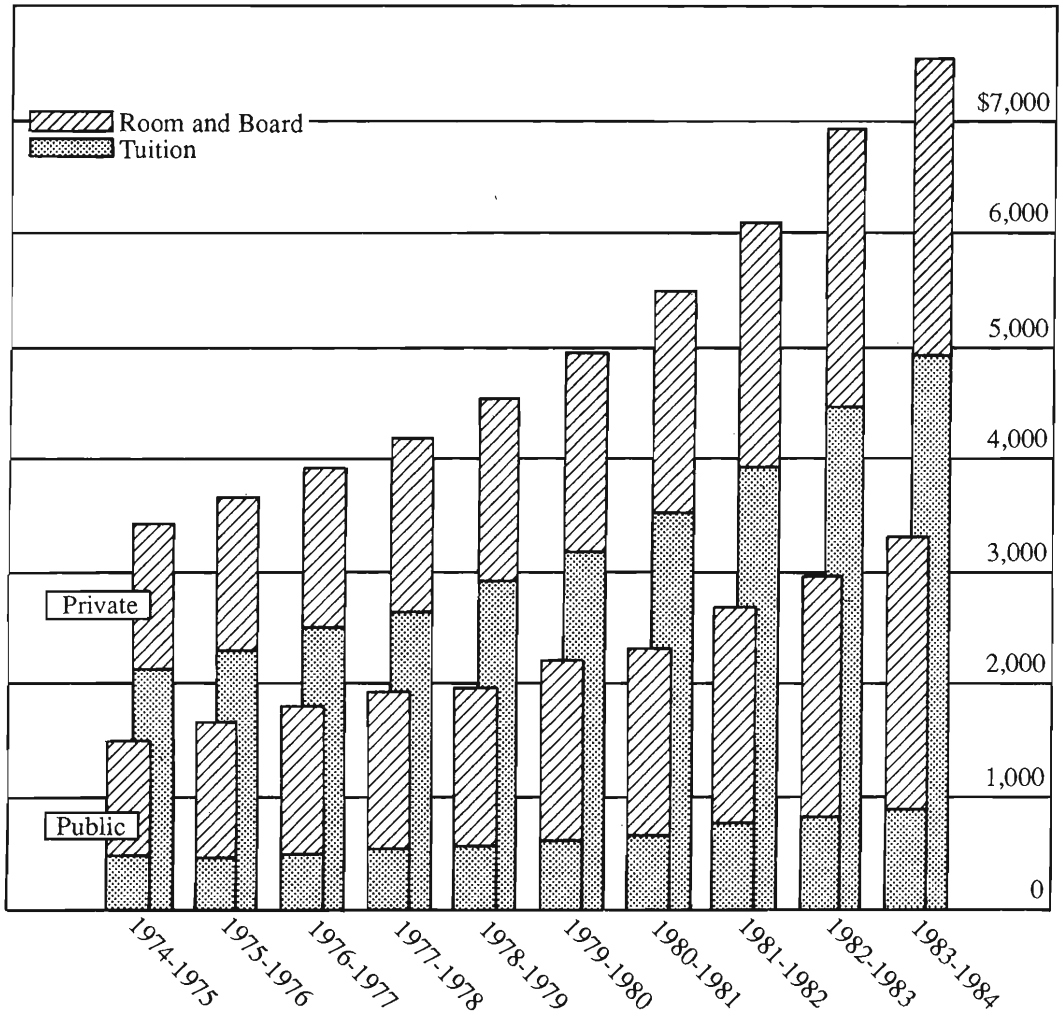
Questions 21-25 refer to the following graph. In these questions, all references to *charges* should be interpreted as the *average annual charges* shown on the graph.

AVERAGE ANNUAL TOTAL CHARGES* FOR UNDERGRADUATE TUITION, ROOM, AND BOARD AT AMERICAN COLLEGES, 1974 - 1984



*The total charge consists of room, board, and tuition.

Note: Drawn to scale.

GO ON TO THE NEXT PAGE.

21. In which school year shown was the total charge for undergraduate tuition, room, and board at public colleges most nearly equal to $3,000 ?

(A) 1983-1984
(B) 1982-1983
(C) 1981-1982
(D) 1980-1981
(E) 1979-1980

22. Which of the following charges increased by less than $1,000 from the first to the last of the ten years represented on the graph?

(A) Tuition at public colleges
(B) Room and board at public colleges
(C) Total charge at public colleges
(D) Tuition at private colleges
(E) Total charge at private colleges

23. For how many of the school years shown was the total charge at private colleges at least $3,000 more than the total charge at public colleges?

(A) Two
(B) Three
(C) Four
(D) Five
(E) Six

24. In the 1978-1979 school year, the ratio of the total charge at private colleges to the total charge at public colleges was closest to

(A) $\frac{5}{3}$
(B) $\frac{9}{5}$
(C) $\frac{2}{1}$
(D) $\frac{9}{4}$
(E) $\frac{3}{1}$

25. For the school year in which the charge for room and board at public colleges was most nearly equal to $2,000, what was the approximate charge for tuition at private colleges?

(A) $750
(B) $3,500
(C) $3,900
(D) $4,500
(E) $4,900

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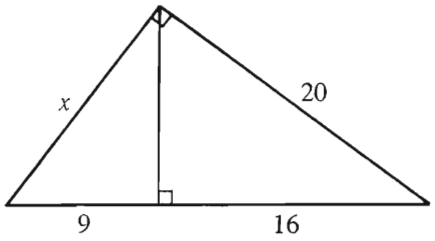


26. What is the value of x in the figure above?

(A) 12
(B) 12.5
(C) 15
(D) $9\sqrt{3}$
(E) 18

27. The number 10^{30} is divisible by all of the following EXCEPT

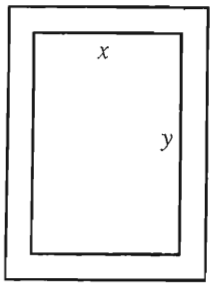
(A) 250
(B) 125
(C) 32
(D) 16
(E) 6

28. If $3x + 1$ represents an odd integer, which of the following represents the next larger odd integer?

(A) $3(x + 1)$
(B) $3(x + 2)$
(C) $3(x + 3)$
(D) $3x + 2$
(E) $3(x + 2) + 1$

29. In the sequence of numbers x_1, x_2, x_3, x_4, x_5, each number after the first is twice the preceding number. If $x_5 - x_1$ is 20, what is the value of x_1?

(A) $\frac{4}{3}$
(B) $\frac{5}{4}$
(C) 2
(D) $\frac{5}{2}$
(E) 4



30. The rectangular garden represented in the figure above, with dimensions x feet by y feet, is surrounded by a walkway 2 feet wide. Which of the following represents the area of the walkway, in square feet?

(A) $2x + 2y + 4$
(B) $2x + 2y + 16$
(C) $4x + 4y + 8$
(D) $4x + 4y + 16$
(E) $4x + 4y + 32$

SECTION 3
Time—30 minutes
25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-7

At an art show, exactly five sculptures are to be displayed in a room with exactly five stands, arranged along a single wall and numbered consecutively 1 through 5. The sculptures are to be selected from a total of eight sculptures—M, N, P, Q, R, S, T, and U—and displayed, one sculpture on each stand, according to the following conditions:

Either M or U or both must be selected.
If M is selected, M must be on stand 1.
Either R or S must be on stand 3.
If T is selected, P must also be selected, and T and P must then be on stands that are immediately adjacent to one another.

1. Which of the following is an acceptable selection of sculptures to be displayed on stands 1 through 5?

	1	2	3	4	5
(A)	M	R	T	P	Q
(B)	N	T	S	U	Q
(C)	P	T	S	R	U
(D)	T	P	R	S	M
(E)	U	N	Q	P	T

2. If S is on stand 1, which of the following must be true?

(A) P is on stand 4.
(B) R is on stand 3.
(C) T is on stand 2.
(D) T is on stand 4.
(E) U is on stand 5.

3. If T is on stand 5, which of the following pairs of sculptures can be on stands that are immediately adjacent to each other?

(A) M and P
(B) Q and N
(C) Q and P
(D) R and T
(E) U and R

4. If U is on stand 4, any of the following can be on stand 5 EXCEPT

(A) N
(B) P
(C) Q
(D) R
(E) T

5. If T is on stand 2, which of the following sculptures must be selected?

(A) M
(B) N
(C) R
(D) S
(E) U

6. If P is not selected and R is on stand 1, which of the following lists, in alphabetical order, those sculptures that must also be selected?

(A) M, Q, T, and U
(B) N, Q, S, and T
(C) N, Q, S, and U
(D) N, S, T, and U
(E) Q, S, T, and U

7. If Q is displayed on a stand immediately adjacent to a stand on which R is displayed and immediately adjacent to a stand on which S is displayed, which of the following must be true?

(A) N is on either stand 4 or stand 5.
(B) Q is on either stand 2 or stand 4.
(C) R is on either stand 1 or stand 3.
(D) S is on either stand 3 or stand 5.
(E) U is on either stand 2 or stand 4.

GO ON TO THE NEXT PAGE.

8. For three years, while constructing a new elementary school, the Middletown school board has been sending large numbers of students from the town of Middletown to both Crestwood and Lynbrook elementary schools in the town of Edgewood. Therefore, when Middletown's new elementary school is completed next year, either Crestwood or Lynbrook will have to be closed and their student populations consolidated.

   The argument above presupposes that

   (A) withdrawal of the Middletown students from the Crestwood and Lynbrook schools will leave one or both of these schools seriously underpopulated
   (B) Middletown's new elementary school will be too small for the projected student population
   (C) the Middletown students represent only a small fraction of the total student populations at both Crestwood and Lynbrook schools
   (D) absorption of extra students from Middletown has placed a serious strain on the resources of both Crestwood and Lynbrook schools
   (E) students will not transfer between the Crestwood and Lynbrook schools in the next twelve months

9. During his three years in office, the governor of a state has frequently been accused of having sexist attitudes toward women. Yet he has filled five of the nineteen vacant high-level positions in his administration with women appointees, all of whom are still serving. This shows that the governor is not sexist.

   Which of the following statements, if true, would most seriously weaken the conclusion above?

   (A) One of the women appointed by the governor to a high-level position is planning to resign her post.
   (B) The platform of the governor's political party required him to appoint at least five women to high-level positions.
   (C) Forty-seven percent of the women who voted in the state gubernatorial election three years ago voted for the governor.
   (D) A governor of a neighboring state recently appointed seven women to high-level positions.
   (E) The governor appointed two Black Americans, two Hispanic Americans, and one Asian American to high-level positions in his administration.

10. Proportionally, more persons diagnosed as having the brain disorder schizophrenia were born in the winter months than at any other time of year. A recent study suggests that the cause may have been the nutrient-poor diets of some expectant mothers during the coldest months of the year, when it was hardest for people to get, or afford, a variety of fresh foods.

    Which of the following, if true, helps to support the conclusion presented above?

    (A) Over the years the number of cases of schizophrenia has not shown a correlation with degree of economic distress.
    (B) Most of the development of brain areas affected in schizophrenia occurs during the last month of the mother's pregnancy.
    (C) Suicide rates are significantly higher in winter than in any other season.
    (D) The nutrients in fresh foods have the same effects on the development of the brain as do the nutrients in preserved foods.
    (E) A sizable proportion of the patients involved in the study have a history of schizophrenia in the family.

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Questions 11-15

From time to time, the managing director of a company appoints planning committees, each consisting of exactly three members. Eligible for appointment are three executives from Finance—F, G, and H—and three executives from Operations—K, L, and M. Any given committee is subject to the following restrictions on appointments:

At least one member must be from Finance, and at least one member must be from Operations.
If F is appointed, G cannot be appointed.
Neither H nor L can be appointed unless the other is appointed also.
If K is appointed, M must also be appointed.

11. Which of the following is an acceptable committee?

(A) F, H, and M
(B) G, L, and M
(C) H, K, and L
(D) H, L, and M
(E) K, L, and M

12. If appointees from Finance are in the majority on a committee, that committee must include

(A) F
(B) G
(C) K
(D) L
(E) M

13. If appointees from Operations are in the majority on a committee, that committee must include

(A) F
(B) G
(C) K
(D) L
(E) M

14. If F is appointed to the same committee as M, which of the following will be true of that committee?

(A) Appointees from Finance are in the majority.
(B) Appointees from Operations are in the majority.
(C) G is a committee member.
(D) L is a committee member.
(E) K is not a committee member.

15. If the restrictions on appointments apply also to a four-member committee appointed from the same group of executives, which of the following will be true?

(A) If F is appointed, M must also be appointed.
(B) If G is appointed, K must also be appointed.
(C) If H is appointed, F must also be appointed.
(D) If L is appointed, G must also be appointed.
(E) If M is appointed, K must also be appointed.

GO ON TO THE NEXT PAGE.

Questions 16-18

A psychologist has designed an experiment that involves running five mice—F, G, J, K, and M—through a maze that is connected to five compartments—1, 2, 3, 4, and 5. The psychologist places each mouse in one of the five compartments. When a bell is rung, each mouse leaves its compartment, runs through the maze, and enters or reenters one of the five compartments. At no point is there more than one mouse in any compartment.

When the bell is rung, any mouse placed in 4 always goes to 2, and any mouse placed in 2 always goes to 4.

When the bell is rung, any mouse placed in 5 always goes to 3, and any mouse placed in 3 always goes to 5.

The psychologist has designed the experiment such that, after the mice have run through the maze, the following outcomes always obtain:

M is neither in 3 nor in 4.
If J is in 1, K is in 2.
If M is in 2, K is in 5.

16. Which of the following is a possible distribution of the mice after they have run through the maze?

	1	2	3	4	5
(A)	J	K	M	F	G
(B)	G	M	K	J	F
(C)	F	J	G	M	K
(D)	J	M	F	K	G
(E)	M	K	G	F	J

17. If M is in 2 after the mice have run through the maze, K must have been in which of the following before running through the maze?

(A) 1
(B) 2
(C) 3
(D) 4
(E) 5

18. If F is in 5 after the mice have run through the maze, M must have been in which of the following before running through the maze?

(A) 1
(B) 2
(C) 3
(D) 4
(E) 5

GO ON TO THE NEXT PAGE.

Questions 19-22

A detective watching suspects Q, R, S, and T and their movements in and out of a downtown building has made the following observations:

Every day, each of the suspects enters, and later leaves, the building exactly once.
No suspect ever enters or leaves the building together with another suspect.
No suspect ever leaves the building in the same position—first, second, third, or fourth—in which he or she entered the building.
Both in entering the building and in leaving it, R is always earlier than S.

19. Which of the following could be the order, from first to last, in which the suspects leave the building on a day on which they enter it in the order T, Q, R, S ?

(A) Q, R, S, T
(B) Q, R, T, S
(C) R, Q, S, T
(D) S, T, Q, R
(E) T, R, S, Q

20. If, on a certain day, Q and T enter the building second and third, respectively, and Q also leaves the building before T does, the order in which the suspects leave the building, from first to fourth, must be

(A) Q, R, S, T
(B) Q, R, T, S
(C) Q, T, R, S
(D) R, Q, S, T
(E) R, S, Q, T

21. On a day on which the two suspects who enter the building first are also the two suspects who leave it first, the last two suspects to enter the building could be

(A) Q and R
(B) Q and T
(C) R and S
(D) R and T
(E) S and T

22. On a day on which R enters the building second and T enters it third, which of the following must be true?

(A) Q leaves the building first.
(B) Q leaves the building third.
(C) R leaves the building first.
(D) S leaves the building third.
(E) T leaves the building second.

GO ON TO THE NEXT PAGE.

23. The primary schools in a city range from one to six stories in height. If a classroom in a primary school is above the second floor, it must have a fireproof door.

    If the statements above are true, which of the following statements must also be true about primary-school rooms in the city?

    (A) Some third-floor rooms in primary schools do not have fireproof doors.
    (B) No second-floor classrooms in primary schools have fireproof doors.
    (C) In primary schools, rooms above the second floor that are not classrooms do not have fireproof doors.
    (D) Any fourth-floor classrooms in primary schools have fireproof doors.
    (E) Primary schools with classrooms on the first floor only do not have any fireproof doors.

24. It is sometimes held that computer scientists would make better progress in developing sophisticated artificial-intelligence programs if only they knew more about how human beings think. This view is, however, open to the objection that not a single major step forward in airplane design has come from any insights into the nature of bird flight.

    The objection above draws on an analogy that assumes that artificial-intelligence programs are similar to which of the following?

    (A) Theories of human thought
    (B) Blueprints for airplanes
    (C) Hypotheses about how science achieves progress
    (D) Computer simulations of birds in flight
    (E) Research into the nature of bird flight

25. Two hundred corporations with net incomes of more than $122 million each accounted for 77 percent of total corporate gifts to United States higher education in 1985. That year, 26 percent of total corporate gifts to United States higher education came from 14 Japanese corporations, each of which received income from 27 or more countries.

    If the statements above are true, which of the following must also be true?

    (A) Most of the net income earned by the 14 Japanese corporations was earned outside of Japan.
    (B) Individuals contributed 23 percent of total gifts to United States higher education in 1985.
    (C) Gifts from corporations accounted for more than half of the total contributions to United States higher education in 1985.
    (D) One or more of the 200 corporations with more than $122 million in net income received income from 27 or more countries.
    (E) Most of the 14 Japanese corporations earned more than $122 million in net income in 1985.

SECTION 4

Time—30 minutes

30 Questions

Numbers: All numbers used are real numbers.

Figures: Position of points, angles, regions, etc. can be assumed to be in the order shown; and angle measures can be assumed to be positive.

Lines shown as straight can be assumed to be straight.

Figures can be assumed to lie in a plane unless otherwise indicated.

Figures that accompany questions are intended to provide information useful in answering the questions. However, unless a note states that a figure is drawn to scale, you should solve these problems NOT by estimating sizes by sight or by measurement, but by using your knowledge of mathematics (see Example 2 below).

Directions: Each of the Questions 1-15 consists of two quantities, one in Column A and one in Column B. You are to compare the two quantities and choose

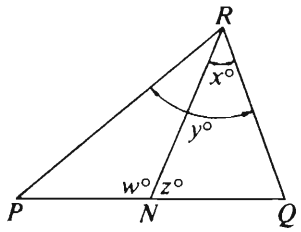
A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

Note: Since there are only four choices, NEVER MARK (E).

Common Information: In a question, information concerning one or both of the quantities to be compared is centered above the two columns. A symbol that appears in both columns represents the same thing in Column A as it does in Column B.

	Column A	Column B	Sample Answers
Example 1:	2×6	$2 + 6$	● Ⓑ Ⓒ Ⓓ Ⓔ

Examples 2-4 refer to $\triangle PQR$.

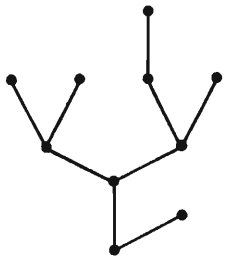


Example 2:	PN	NQ	Ⓐ Ⓑ Ⓒ ● Ⓔ (since equal measures cannot be assumed, even though PN and NQ appear equal)
Example 3:	x	y	Ⓐ ● Ⓒ Ⓓ Ⓔ (since N is between P and Q)
Example 4:	$w + z$	180	Ⓐ Ⓑ ● Ⓓ Ⓔ (since PQ is a straight line)

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B

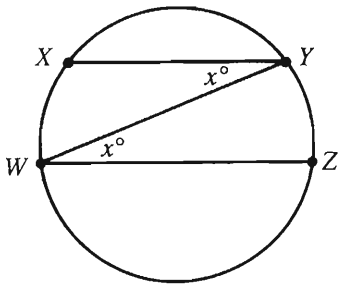


Each •——• represents a connection and each • represents a joint.

1.	The total number of joints	The total number of connections

$y = \frac{3x}{4}$, $x = \frac{2z}{3}$, and $z = 20$.

2.	y	11



3.	The length of minor arc WX of the circle	The length of minor arc YZ of the circle
4.	0.203×10^2	2.03×10
5.	40 percent of \$250	80 percent of \$125

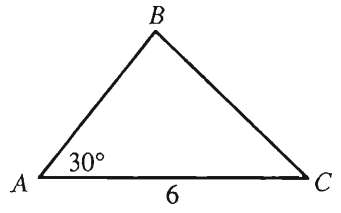
	Column A	Column B

$x \neq 0$

6.	$3x^2$	$(3x)^2$
7.	The greatest prime factor of 15	The greatest prime factor of 14
8.	The total savings on 20 gallons of gasoline purchased for \$1.169 per gallon instead of \$1.259 per gallon.	\$1.80

Three ships, X, Y, and Z, are near the equator. X is 8 miles due west of Z, and Y is 7 miles due north of Z.

9.	The distance between X and Y	9 miles



10.	AB	BC

A retail business has determined that its net income, in terms of x, the number of items sold, is given by the expression $x^2 + x - 380$.

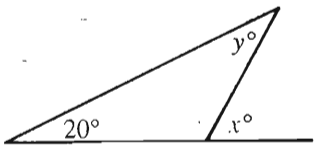
11.	The number of items that must be sold for the net income to be zero	10

GO ON TO THE NEXT PAGE.

A if the quantity in Column A is greater;
B if the quantity in Column B is greater;
C if the two quantities are equal;
D if the relationship cannot be determined from the information given.

	Column A	Column B
	Rectangular region R has area 30.	
12.	The perimeter of R	25

	Column A	Column B
	$x^2 = 16$ $y^3 = 64$	
14.	x	y



$x < 90$

	Column A	Column B
13.	y	70

	Column A	Column B
15.	$\frac{2^{30} - 2^{29}}{2}$	2^{28}

GO ON TO THE NEXT PAGE.

Directions: Each of the Questions 16-30 has five answer choices. For each of these questions, select the best of the answer choices given.

16. A certain post office imposes a service charge of \$0.75 per order on any money order in the amount of \$25.00 or less, and \$1.00 per order on any money order in an amount from \$25.01 through \$700.00. If Dan purchases 3 money orders in the amounts of \$18.25, \$25.00, and \$127.50, what is the total service charge for his money orders?

(A) \$1.75
(B) \$2.25
(C) \$2.50
(D) \$2.75
(E) \$3.00

17. If $\frac{1}{4}(1 - x) = \frac{1}{16}$, then $x =$

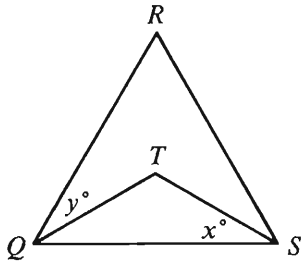
(A) $\frac{15}{64}$

(B) $\frac{1}{4}$

(C) $\frac{3}{4}$

(D) $\frac{15}{16}$

(E) 4



Note: Figure not drawn to scale.

18. In the figure above, QRS is an equilateral triangle and QTS is an isosceles triangle. If $x = 47$, what is the value of y?

(A) 13
(B) 23
(C) 30
(D) 47
(E) 53

19. $\frac{m + n}{4 + 5} =$

(A) $\frac{m + n}{4} + \frac{m + n}{5}$

(B) $\frac{m + n}{9} + \frac{m + n}{9}$

(C) $\frac{m}{5} + \frac{n}{4}$

(D) $\frac{m}{4} + \frac{n}{5}$

(E) $\frac{m}{9} + \frac{n}{9}$

20. What is the circumference of a circle with radius 8 ?

(A) $\frac{8}{\pi}$

(B) $\frac{16}{\pi}$

(C) 8π

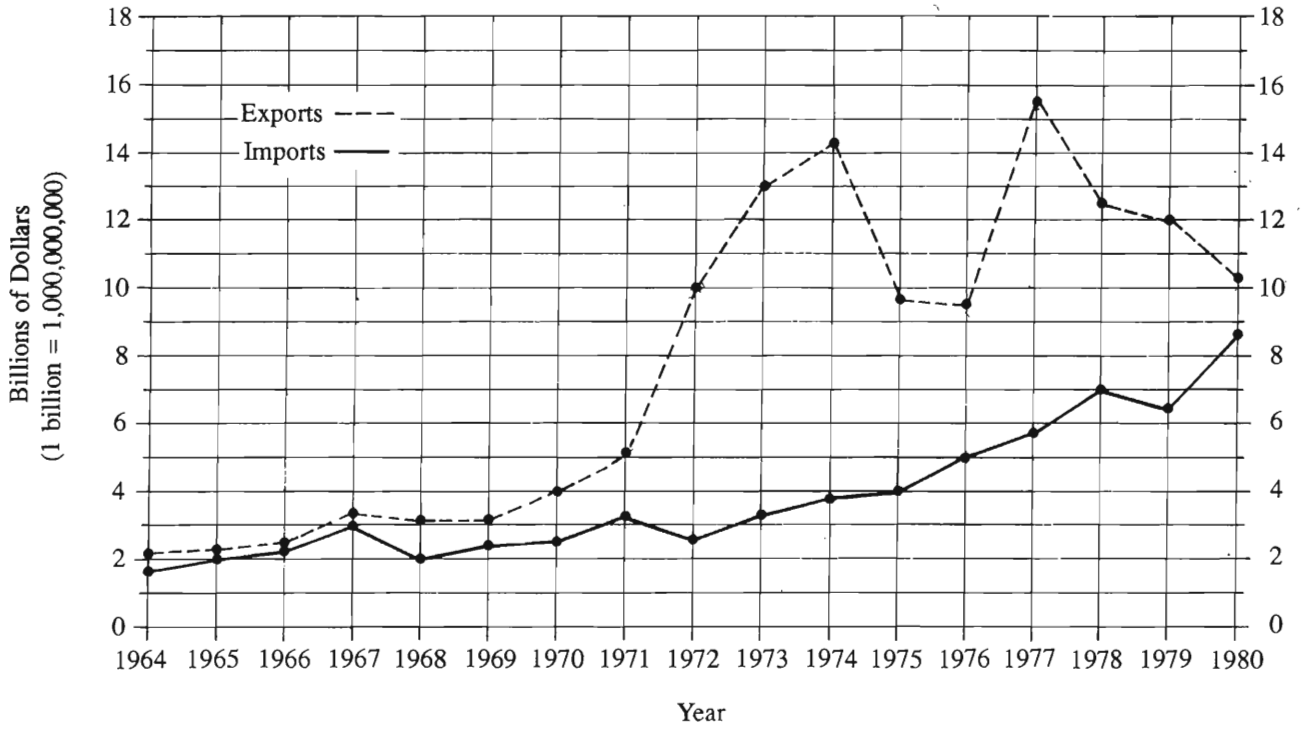
(D) 16π

(E) 64π

GO ON TO THE NEXT PAGE.

Questions 21-25 refer to the following graph.

FOREIGN TRADE OF COUNTRY *X*, 1964-1980
(in United States dollars)



Note: Drawn to scale.

GO ON TO THE NEXT PAGE.

21. For which year shown on the graph did exports exceed the previous year's exports by the greatest dollar amount?

(A) 1972
(B) 1973
(C) 1975
(D) 1977
(E) 1980

22. Which of the following is closest to the amount, in billions of dollars, by which the increase in exports from 1971 to 1972 exceeds the increase in exports from 1972 to 1973 ?

(A) 1.9
(B) 3.9
(C) 5.0
(D) 6.1
(E) 8.0

23. In 1974 the dollar value of imports was approximately what percent of the dollar value of exports?

(A) 4%
(B) 17%
(C) 27%
(D) 79%
(E) 367%

24. For how many years shown on the graph did exports exceed imports by more than 5 billion dollars?

(A) Nine
(B) Seven
(C) Six
(D) Five
(E) Four

25. If it were discovered that the import dollar amount shown for 1978 was incorrect and should have been $5.3 billion instead, then the average (arithmetic mean) import dollar amount per year for the 17 years would be how much less?

(A) $100 million
(B) $53 million
(C) $47 million
(D) $17 million
(E) $7 million

GO ON TO THE NEXT PAGE.

26. On the number line, 1.4 is halfway between which of the following pairs of numbers?

(A) -1.4 and 2.4
(B) -1 and 2
(C) -0.3 and 3.1
(D) 0.15 and 1.55
(E) 0.4 and 1

27. If a and b are both positive even integers, which of the following must be even?

I. a^b
II. $(a + 1)^b$
III. $a^{(b+1)}$

(A) I only
(B) II only
(C) I and II only
(D) I and III only
(E) I, II, and III

28. If t tablets cost c cents, then at this rate how many cents will 5 tablets cost?

(A) $5ct$
(B) $\frac{5c}{t}$
(C) $\frac{c}{5t}$
(D) $\frac{5t}{c}$
(E) $\frac{t}{5c}$

29. If a rectangular block that is 4 inches by 4 inches by 10 inches is placed inside a right circular cylinder of radius 3 inches and height 10 inches, the volume of the unoccupied portion of the cylinder is how many cubic inches?

(A) $6\pi - 16$
(B) $9\pi - 16$
(C) $160 - 30\pi$
(D) $60\pi - 160$
(E) $90\pi - 160$

$$x - y + z = 0$$
$$2x + y + 3z = 0$$

30. In the system of equations above, if $z \neq 0$, then the ratio of x to z is

(A) $-\frac{2}{1}$
(B) $-\frac{4}{3}$
(C) $-\frac{1}{2}$
(D) $\frac{3}{4}$
(E) $\frac{4}{3}$

SECTION 5
Time—30 minutes
38 Questions

Directions: Each sentence below has one or two blanks, each blank indicating that something has been omitted. Beneath the sentence are five lettered words or sets of words. Choose the word or set of words for each blank that best fits the meaning of the sentence as a whole.

1. Because it is ------- to ------- all the business costs related to employee discontent, an accurate estimate of the magnitude of these costs is not easily calculated.

   (A) difficult. .measure
   (B) impossible. .justify
   (C) improper. .overlook
   (D) useless. .discover
   (E) necessary. .pinpoint

2. Consider the universal cannibalism of the sea, all of whose creatures ------- one another.

   (A) hide from
   (B) ferret out
   (C) prey on
   (D) glide among
   (E) compete against

3. How could words, confined as they individually are to certain ------- meanings specified in a dictionary, eventually come, when combined in groups, to create obscurity and actually to prevent thought from being -------?

   (A) indefinite. .articulated
   (B) conventional. .conceivable
   (C) unlikely. .classified
   (D) archaic. .expressed
   (E) precise. .communicable

4. Even though they tended to be ------- strangers, fifteenth-century Europeans did not automatically associate ------- and danger.

   (A) trusting of. .diversity
   (B) haughty with. .nonconformity
   (C) interested in. .enmity
   (D) antagonistic to. .rudeness
   (E) hostile to. .foreignness

5. The modern age is a permissive one in which things can be said explicitly, but the old tradition of ------- dies hard.

   (A) garrulousness
   (B) exaggeration
   (C) excoriation
   (D) bombast
   (E) euphemism

6. Although many findings of the Soviet and United States probes of Venus were complementary, the two sets of atmospheric results clearly could not be ------- without a major change of data or -------.

   (A) obtained. .experimentation
   (B) completed. .position
   (C) matched. .implementation
   (D) reconciled. .interpretation
   (E) produced. .falsification

7. While it is assumed that the mechanization of work has a ------- effect on the lives of workers, there is evidence available to suggest that, on the contrary, mechanization has served to ------- some of the traditional roles of women.

   (A) salutary. .improve
   (B) dramatic. .undermine
   (C) benign. .revise
   (D) debilitating. .weaken
   (E) revolutionary. .reinforce

GO ON TO THE NEXT PAGE.

Directions: In each of the following questions, a related pair of words or phrases is followed by five lettered pairs of words or phrases. Select the lettered pair that best expresses a relationship similar to that expressed in the original pair.

8. PILOT : SHIP :: (A) surveyor : landscape
(B) conductor : orchestra (C) guard : stockade
(D) actor : scene (E) philosopher : inspiration

9. TOPSOIL : ERODE :: (A) leather : tan
(B) veneer : varnish (C) roast : baste
(D) grain : mash (E) paint : peel

10. SCREEN : MOVIE :: (A) shelf : book
(B) frame : portrait (C) shadow : object
(D) stage : play (E) score : performance

11. VOLCANO : LAVA ::
(A) geyser : water
(B) fault : tremor
(C) glacier : fissure
(D) avalanche : snow
(E) cavern : limestone

12. COGENT : CONVINCE ::
(A) irrational : disturb
(B) repugnant : repel
(C) dangerous : avoid
(D) eloquent : refine
(E) generous : appreciate

13. CHARY : CAUTION ::
(A) circumspect : recklessness
(B) imperturbable : composure
(C) meticulous : resourcefulness
(D) exigent : stability
(E) fortuitous : pluck

14. USURY : INTEREST ::
(A) fraud : property
(B) gouging : price
(C) monopoly : production
(D) foreclosure : mortgage
(E) embezzlement : savings

15. EPITHET : DISPARAGE ::
(A) abbreviation : proliferate
(B) hieroglyphic : mythologize
(C) diminutive : respect
(D) code : simplify
(E) alias : mislead

16. OFFENSE : PECCADILLO ::
(A) envy : resentment
(B) quarrel : tiff
(C) affinity : wish
(D) depression : regret
(E) homesickness : nostalgia

GO ON TO THE NEXT PAGE.

Directions: Each passage in this group is followed by questions based on its content. After reading a passage, choose the best answer to each question. Answer all questions following a passage on the basis of what is stated or implied in that passage.

Since the Hawaiian Islands have never been connected to other land masses, the great variety of plants in Hawaii must be a result of the long-distance dispersal of seeds, a process that requires both a method of transport and an equivalence between the ecology of the source area and that of the recipient area.

There is some dispute about the method of transport involved. Some biologists argue that ocean and air currents are responsible for the transport of plant seeds to Hawaii. Yet the results of flotation experiments and the low temperatures of air currents cast doubt on these hypotheses. More probable is bird transport, either externally, by accidental attachment of the seeds to feathers, or internally, by the swallowing of fruit and subsequent excretion of the seeds. While it is likely that fewer varieties of plant seeds have reached Hawaii externally than internally, more varieties are known to be adapted to external than to internal transport.

17. The author of the passage is primarily concerned with
    (A) discussing different approaches biologists have taken to testing theories about the distribution of plants in Hawaii
    (B) discussing different theories about the transport of plant seeds to Hawaii
    (C) discussing the extent to which air currents are responsible for the dispersal of plant seeds to Hawaii
    (D) resolving a dispute about the adaptability of plant seeds to bird transport
    (E) resolving a dispute about the ability of birds to carry plant seeds long distances

18. The author mentions the results of flotation experiments on plant seeds (lines 10-12) most probably in order to
    (A) support the claim that the distribution of plants in Hawaii is the result of the long-distance dispersal of seeds
    (B) lend credibility to the thesis that air currents provide a method of transport for plant seeds to Hawaii
    (C) suggest that the long-distance dispersal of seeds is a process that requires long periods of time
    (D) challenge the claim that ocean currents are responsible for the transport of plant seeds to Hawaii
    (E) refute the claim that Hawaiian flora evolved independently from flora in other parts of the world

19. It can be inferred from information in the passage that the existence in alpine regions of Hawaii of a plant species that also grows in the southwestern United States would justify which of the following conclusions?
    (A) The ecology of the southwestern United States is similar in important respects to the ecology of alpine regions of Hawaii.
    (B) There are ocean currents that flow from the southwestern United States to Hawaii.
    (C) The plant species discovered in Hawaii must have traveled from the southwestern United States only very recently.
    (D) The plant species discovered in Hawaii reached there by attaching to the feathers of birds migrating from the southwestern United States.
    (E) The plant species discovered in Hawaii is especially well adapted to transport over long distances.

20. The passage supplies information for answering which of the following questions?
    (A) Why does successful long-distance dispersal of plant seeds require an equivalence between the ecology of the source area and that of the recipient area?
    (B) Why are more varieties of plant seeds adapted to external rather than to internal bird transport?
    (C) What varieties of plant seeds are birds that fly long distances most likely to swallow?
    (D) What is a reason for accepting the long-distance dispersal of plant seeds as an explanation for the origin of Hawaiian flora?
    (E) What evidence do biologists cite to argue that ocean and air currents are responsible for the transport of plant seeds to Hawaii?

GO ON TO THE NEXT PAGE.

A long-held view of the history of the English colonies that became the United States has been that England's policy toward these colonies before 1763 was dictated by commercial interests and that a change to a more imperial policy, dominated by expansionist militarist objectives, generated the tensions that ultimately led to the American Revolution. In a recent study, Stephen Saunders Webb has presented a formidable challenge to this view. According to Webb, England already had a military imperial policy for more than a century before the American Revolution. He sees Charles II, the English monarch between 1660 and 1685, as the proper successor of the Tudor monarchs of the sixteenth century and of Oliver Cromwell, all of whom were bent on extending centralized executive power over England's possessions through the use of what Webb calls "garrison government." Garrison government allowed the colonists a legislative assembly, but real authority, in Webb's view, belonged to the colonial governor, who was appointed by the king and supported by the "garrison," that is, by the local contingent of English troops under the colonial governor's command.

According to Webb, the purpose of garrison government was to provide military support for a royal policy designed to limit the power of the upper classes in the American colonies. Webb argues that the colonial legislative assemblies represented the interests not of the common people but of the colonial upper classes, a coalition of merchants and nobility who favored self-rule and sought to elevate legislative authority at the expense of the executive. It was, according to Webb, the colonial governors who favored the small farmer, opposed the plantation system, and tried through taxation to break up large holdings of land. Backed by the military presence of the garrison, these governors tried to prevent the gentry and merchants, allied in the colonial assemblies, from transforming colonial America into a capitalistic oligarchy.

Webb's study illuminates the political alignments that existed in the colonies in the century prior to the American Revolution, but his view of the crown's use of the military as an instrument of colonial policy is not entirely convincing. England during the seventeenth century was not noted for its military achievements. Cromwell did mount England's most ambitious overseas military expedition in more than a century, but it proved to be an utter failure. Under Charles II, the English army was too small to be a major instrument of government. Not until the war with France in 1697 did William III persuade Parliament to create a professional standing army, and Parliament's price for doing so was to keep the army under tight legislative control. While it may be true that the crown attempted to curtail the power of the colonial upper classes, it is hard to imagine how the English army during the seventeenth century could have provided significant military support for such a policy.

21. The passage can best be described as a
    (A) survey of the inadequacies of a conventional viewpoint
    (B) reconciliation of opposing points of view
    (C) summary and evaluation of a recent study
    (D) defense of a new thesis from anticipated objections
    (E) review of the subtle distinctions between apparently similar views

22. The passage suggests that the view referred to in lines 1-7 argued that
    (A) the colonial governors were sympathetic to the demands of the common people
    (B) Charles II was a pivotal figure in the shift of English monarchs toward a more imperial policy in their governorship of the American colonies
    (C) the American Revolution was generated largely out of a conflict between the colonial upper classes and an alliance of merchants and small farmers
    (D) the military did not play a major role as an instrument of colonial policy until 1763
    (E) the colonial legislative assemblies in the colonies had little influence over the colonial governors

23. It can be inferred from the passage that Webb would be most likely to agree with which of the following statements regarding garrison government?
    (A) Garrison government gave legislative assemblies in the colonies relatively little authority, compared to the authority that it gave the colonial governors.
    (B) Garrison government proved relatively ineffective until it was used by Charles II to curb the power of colonial legislatures.
    (C) Garrison government became a less viable colonial policy as the English Parliament began to exert tighter legislative control over the English military.
    (D) Oliver Cromwell was the first English ruler to make use of garrison government on a large scale.
    (E) The creation of a professional standing army in England in 1697 actually weakened garrison government by diverting troops from the garrisons stationed in the American colonies.

GO ON TO THE NEXT PAGE.

24. According to the passage, Webb views Charles II as the "proper successor" (line 13) of the Tudor monarchs and Cromwell because Charles II

(A) used colonial tax revenues to fund overseas military expeditions
(B) used the military to extend executive power over the English colonies
(C) wished to transform the American colonies into capitalistic oligarchies
(D) resisted the English Parliament's efforts to exert control over the military
(E) allowed the American colonists to use legislative assemblies as a forum for resolving grievances against the crown

25. Which of the following, if true, would most seriously weaken the author's assertion in lines 54-58 ?

(A) Because they were poorly administered, Cromwell's overseas military expeditions were doomed to failure.
(B) Because it relied primarily on the symbolic presence of the military, garrison government could be effectively administered with a relatively small number of troops.
(C) Until early in the seventeenth century, no professional standing army in Europe had performed effectively in overseas military expeditions.
(D) Many of the colonial governors appointed by the crown were also commissioned army officers.
(E) Many of the English troops stationed in the American colonies were veterans of other overseas military expeditions.

26. According to Webb's view of colonial history, which of the following was (were) true of the merchants and nobility mentioned in line 30 ?

I. They were opposed to policies formulated by Charles II that would have transformed the colonies into capitalistic oligarchies.
II. They were opposed to attempts by the English crown to limit the power of the legislative assemblies.
III. They were united with small farmers in their opposition to the stationing of English troops in the colonies.

(A) I only
(B) II only
(C) I and II only
(D) II and III only
(E) I, II, and III

27. The author suggests that if William III had wanted to make use of the standing army mentioned in line 52 to administer garrison government in the American colonies, he would have had to

(A) make peace with France
(B) abolish the colonial legislative assemblies
(C) seek approval from the English Parliament
(D) appoint colonial governors who were more sympathetic to royal policy
(E) raise additional revenues by increasing taxation of large landholdings in the colonies

GO ON TO THE NEXT PAGE.

Directions: Each question below consists of a word printed in capital letters, followed by five lettered words or phrases. Choose the lettered word or phrase that is most nearly opposite in meaning to the word in capital letters.

Since some of the questions require you to distinguish fine shades of meaning, be sure to consider all the choices before deciding which one is best.

28. FLUCTUATE: (A) work for (B) flow over (C) follow from (D) remain steady (E) cling together

29. PRECARIOUS: (A) safe (B) covert (C) rescued (D) revived (E) pledged

30. FUMBLE: (A) organize neatly (B) say clearly (C) prepare carefully (D) handle adroitly (E) replace immediately

31. AUTHENTIC: (A) ordinary (B) criminal (C) unattractive (D) inexpensive (E) bogus

32. COWER: (A) swiftly disappear (B) brazenly confront (C) assuage (D) coast (E) invert

33. PRISTINE: (A) ruthless (B) seductive (C) coarse (D) commonplace (E) contaminated

34. LAMBASTE: (A) permit (B) prefer (C) extol (D) smooth completely (E) support openly

35. VISCID: (A) bent (B) prone (C) cool (D) slick (E) slight

36. TURPITUDE: (A) saintly behavior (B) clever conversation (C) lively imagination (D) agitation (E) lucidity

37. PHILISTINE: (A) perfectionist (B) aesthete (C) iconoclast (D) critic (E) cynic

38. ODIUM: (A) ease (B) fragrance (C) resignation (D) eccentricity (E) infatuation

SECTION 6

Time—30 minutes

25 Questions

Directions: Each question or group of questions is based on a passage or set of conditions. In answering some of the questions, it may be useful to draw a rough diagram. For each question, select the best answer choice given.

Questions 1-6

Seven airline flights—101, 102, 103, 104, 105, 106, and 107—are to be scheduled for departure, one at a time on the hour, from 9:00 a.m. until 3:00 p.m. The schedule must conform to the following requirements:

Flight 101 must depart at 9:00 a.m.
Flight 105 must depart later than Flight 103, and also later than Flight 102.
Flights 104, 106, and 107 must depart on consecutive hours in that order.

1. If Flight 107 is scheduled to depart at noon, Flight 105 must be scheduled to depart at

(A) 10:00 a.m.
(B) 11:00 a.m.
(C) 1:00 p.m.
(D) 2:00 p.m.
(E) 3:00 p.m.

2. If Flights 103 and 104 are scheduled to depart at 11:00 a.m. and 12 noon, respectively, Flight 102 must be scheduled to depart at

(A) 9:00 a.m.
(B) 10:00 a.m.
(C) 1:00 p.m.
(D) 2:00 p.m.
(E) 3:00 p.m.

3. Which of the following lists three flights in a sequence, from first to last, in which they could be scheduled to depart consecutively?

(A) 101, 104, 103
(B) 102, 103, 106
(C) 104, 105, 106
(D) 106, 107, 103
(E) 106, 107, 104

4. If Flight 106 is scheduled to depart at 2:00 p.m., Flight 105 must be scheduled to depart at

(A) 10:00 a.m.
(B) 11:00 a.m.
(C) 12 noon
(D) 1:00 p.m.
(E) 2:00 p.m.

5. Which of the following must be true about the scheduled order of the flights?

(A) Flight 103 is scheduled to depart later than Flight 102.
(B) Flight 104 is scheduled to depart later than Flight 103.
(C) Flight 105 is scheduled to depart later than Flight 104.
(D) Flight 106 is scheduled to depart later than Flight 105.
(E) Flight 107 is scheduled to depart later than Flight 106.

6. What is the latest hour at which Flight 102 can be scheduled to depart?

(A) 10:00 a.m.
(B) 11:00 a.m.
(C) 12 noon
(D) 1:00 p.m.
(E) 2:00 p.m.

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7. In an experiment, two hundred mice of a strain that is normally free of leukemia were given equal doses of radiation. Half the mice were then allowed to eat their usual foods without restraint, while the other half were given adequate but limited amounts of the same foods. Of the first group, fifty-five developed leukemia; of the second, only three.

   The experiment above best supports which of the following conclusions?

   (A) Leukemia inexplicably strikes some individuals from strains of mice normally free of the disease.
   (B) The incidence of leukemia in mice of this strain which have been exposed to the experimental doses of radiation can be kept down by limiting their intake of food.
   (C) Experimental exposure to radiation has very little effect on the development of leukemia in any strain of mice.
   (D) Given unlimited access to food, a mouse eventually settles on a diet that is optimum for its health.
   (E) Allowing mice to eat their usual foods increases the likelihood that the mice will develop leukemia whether or not they have been exposed to radiation.

8. Children born blind or deaf and blind begin social smiling on roughly the same schedule as most children, by about three months of age.

   The information above provides evidence to support which of the following hypotheses?

   (A) For babies, the survival advantage of smiling consists in bonding the caregiver to the infant.
   (B) Babies do not smile when no one else is present.
   (C) The smiling response depends on an inborn trait determining a certain pattern of development.
   (D) Smiling between persons basically signals a mutual lack of aggressive intent.
   (E) When a baby begins smiling, its caregivers begin responding to it as they would to a person in conversation.

9. Restoration of the original paint colors in Colonial-era rooms has until now relied on the technique of scraping paint in a small area down to the chronological level that represents the paint layer of the Colonial period and then matching the color found at that level. This color was most often the color of putty.

   Which of the following, if true, most seriously weakens the validity of the procedure described above?

   (A) If the scraping is too deep, a scratch will be made in the surface of the original paint.
   (B) In the Colonial period, it was customary to paint all the walls of a room the same solid color.
   (C) It is possible to distinguish the paint used in stenciled border designs, such as those used in the Colonial period, from the underlying paint layer.
   (D) The original colors were altered over the years by reactions with air, light, and dirt to become putty-colored.
   (E) Contemporary paint materials include many that did not exist in Colonial times.

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Questions 10-14

A farmer is deciding which crops to plant. Either three or four fields will be planted; in each field only one crop will be planted. Exactly the same fields that are planted the first year will be planted the second year, but no field will be planted to the same crop for two consecutive years. For each field, the farmer will choose from among five possible crops—corn, soybeans, alfalfa, rye, and barley—according to the following conditions:

In any year, at least one field will be planted to a cereal grain; the possible grains include corn, rye, and barley only.
The year after corn is planted in a field, either soybeans or alfalfa must be planted in that field.

10. In a year in which corn is not planted, which of the following is true?

(A) Either alfalfa or soybeans, but not both, must be planted.
(B) Either barley or rye, or both, must be planted.
(C) Both alfalfa and soybeans must be planted.
(D) Both alfalfa and rye must be planted.
(E) Either barley or soybeans must be the only crop planted.

11. If the farmer plants three fields, each of the following is a possible selection of crops for the first year EXCEPT

(A) barley, barley, barley
(B) barley, rye, soybeans
(C) corn, corn, corn
(D) corn, alfalfa, barley
(E) rye, rye, rye

12. If the farmer plants three fields to corn, corn, and soybeans, respectively, which of the following selections is possible for the same three fields the following year?

(A) Alfalfa, alfalfa, barley, respectively
(B) Alfalfa, soybeans, soybeans, respectively
(C) Rye, rye, soybeans, respectively
(D) Soybeans, corn, corn, respectively
(E) Soybeans, rye, rye, respectively

13. If the farmer plants four fields, with corn in two of the fields the first year, how many crops must there be that are not planted the first year in any field but have to be planted the next year in some field?

(A) 0
(B) 1
(C) 2
(D) 3
(E) 4

14. If the farmer plants four fields, the maximum number of the fields that can be planted to grains in both years is

(A) 0
(B) 1
(C) 2
(D) 3
(E) 4

GO ON TO THE NEXT PAGE.

Questions 15-17

A square, floating platform is supported at its corners by four hollow vessels that are labeled 1, 2, 3, and 4. 1 is diagonally across from 3, and 2 is diagonally across from 4. Three of the vessels are each filled with a different liquid—N, O, or P—and the remaining vessel is empty, except while there is a transfer of liquid in progress. The empty vessel can be filled to capacity by having all of the liquid from one of the other three vessels pumped into it as follows:

If 2 is empty, the liquid contained in 1 can be transferred to 2.
If 3 is empty, the liquid contained in 2 can be transferred to 3.
If 4 is empty, the liquid contained in 3 can be transferred to 4.
If 1 is empty, the liquid contained in 3 or the liquid contained in 4 can be transferred to 1.
No other transfers are possible.

O is the heaviest of the three liquids, and the platform is always tilted toward the vessel containing O; the platform is tilted maximally when, and only when, the vessel containing O is diagonally across from the empty vessel.

15. If 1, 3, and 4 contain N, O, and P, respectively, and if there is then exactly one transfer of liquid, that transfer must have which of the following results?

(A) N is in 2.
(B) O is in 1.
(C) O is in 2.
(D) O is in 4.
(E) P is in 1.

16. If P is in 4 and could be the next liquid to be transferred, which of the following must be true?

(A) The empty vessel is 1.
(B) The empty vessel is 2.
(C) The empty vessel is 3.
(D) N cannot be the next liquid to be transferred.
(E) O cannot be the next liquid to be transferred.

17. If 1, 2, and 4 contain O, N, and P, respectively, and if exactly three transfers are subsequently made, which of the following could be the resulting contents of the four vessels?

	1	2	3	4
(A)	Empty	O	P	N
(B)	N	P	O	Empty
(C)	O	Empty	N	P
(D)	P	N	Empty	O
(E)	P	O	N	Empty

GO ON TO THE NEXT PAGE.

Questions 18-22

Within an array there are four significant positions—positions 1 through 4. When the elements forming the array—R, S, T, and U—are stationary, there is one of them in each of the four positions. Periodically, there are reorderings of the elements in accordance with the following laws:

During each reordering, exactly one of the elements, the anchor, retains its position, and each of the other three elements moves to a new position.
Only R and U can be anchors.
U can be the anchor only when it is in position 3 or position 4.
Any reordering anchored by U must be followed by a reordering anchored by R.
R can be the anchor in up to two consecutive reorderings.
Any given array consists of the four elements in the order of their positions from 1 through 4.

18. If U R T S is an array and if exactly one reordering occurs, which of the following can be the array resulting from that reordering?

(A) R S T U
(B) S R T U
(C) S R U T
(D) T R U S
(E) U S R T

19. If R T S U is an array and if exactly one reordering occurs, with the result that S is in position 1, which of the following must also be a result of that reordering?

(A) R is in position 3.
(B) R is in position 4.
(C) T is in position 2.
(D) T is in position 3.
(E) U is in position 3.

20. If R moves from position 4 to position 1 in the course of a reordering, which of the following can also occur in the course of that reordering?

(A) S moves from position 1 to position 2.
(B) S moves from position 1 to position 3.
(C) S moves from position 1 to position 4.
(D) T moves from position 2 to position 3.
(E) T moves from position 3 to position 2.

21. If the array U S T R has resulted from a reordering, and if exactly two additional reorderings occur, with the result that S is again in position 2, which of the following must have been the array after the first of the two additional reorderings?

(A) S T U R
(B) T S U R
(C) T U S R
(D) U R S T
(E) U T R S

22. If S R U T is an array and if exactly two reorderings occur, the first anchored by R and the second anchored by U, which of the following must be true directly after the second of the two reorderings?

(A) R is in position 1.
(B) S is in position 1.
(C) R is in position 2.
(D) T is in position 3.
(E) U is in position 4.

GO ON TO THE NEXT PAGE.

23. Recent surveys show that many people who seek medical help are under a great deal of stress. Medical research also shows that stress can adversely affect an individual's immune system, which is responsible for combating many infections. Thus when a person is under stress, he or she is more likely to become ill.

Which of the following, if true, would most strengthen the conclusion above?

(A) Many businesses that provide health insurance for their employees also provide seminars on stress management.
(B) Many businesses report a significant decrease in absenteeism during periods when employees feel pressured by management.
(C) There is a marked decrease in the number of complaints presented at college infirmaries during vacation time.
(D) There is a marked increase in the number of illnesses treated at college infirmaries around the time of examinations.
(E) Most people report that being in a hospital or an infirmary is a stressful situation.

24. Although compact cars make up only 38 percent of the vehicles in traffic, 48 percent of the cars that are followed too closely ("tailgated") are compact. On the other hand, fewer than 27 percent of the cars tailgated are middle-sized, even though middle-sized cars make up 31 percent of the vehicles in traffic.

Which of the following, if true, most contributes to an explanation for the phenomenon described above?

(A) The shape of compact cars makes it easy for a tailgater to see far enough ahead around such cars to minimize the chances of a rear-end collision.
(B) Middle-sized cars, owned by families with children and pets, are likely to have bumper stickers that are so interesting to read that tailgaters stay behind such cars longer.
(C) Compact cars sometimes have superior engines that allow them to pass middle-sized cars on the highway easily.
(D) The percentage of cars on the highway that are middle-sized has been steadily decreasing over the last decade.
(E) Compact cars are often driven by fast drivers.

25. As part of a delicately balanced system, the human heart secretes a hormone, a substance that controls the amount of salt in the blood and the volume of blood circulating within the body. Only very small quantities of the hormone are required. This hormone is extremely important in regulating blood pressure and is found in large amounts in the blood of those suffering a heart attack.

If the statements above are true, then it must also be true that

(A) if there is a deficiency in the amount of heart hormone secreted, low blood pressure will result
(B) it is large quantities of the heart hormone that cause heart attacks to occur
(C) the effects of a small amount of the heart hormone will be long-lasting in the body
(D) if a device that is only a mechanical pump is used as an artificial heart, it will not perform all the functions of the human heart
(E) any drug that regulates blood pressure will have its effect by influencing the amount of the heart hormone secreted

FOR GENERAL TEST 27 ONLY

Answer Key and Percentages* of Examinees Answering Each Question Correctly

VERBAL ABILITY					
Section 1			Section 5		
Number	Answer	P+	Number	Answer	P+
1	A	94	1	A	90
2	C	91	2	C	94
3	A	77	3	E	69
4	C	66	4	E	71
5	A	61	5	E	51
6	E	53	6	D	58
7	E	27	7	E	36
8	E	82	8	B	86
9	B	83	9	E	91
10	E	65	10	D	80
11	C	81	11	A	79
12	D	53	12	B	42
13	A	47	13	B	37
14	C	45	14	B	30
15	D	33	15	E	27
16	B	28	16	B	45
17	D	49	17	B	86
18	B	47	18	D	82
19	B	37	19	A	47
20	B	68	20	D	61
21	B	60	21	C	58
22	A	72	22	D	37
23	D	37	23	A	68
24	E	58	24	B	69
25	D	46	25	B	49
26	A	61	26	B	40
27	D	39	27	C	55
28	C	93	28	D	94
29	C	81	29	A	78
30	E	79	30	D	80
31	D	80	31	E	81
32	C	79	32	B	84
33	D	33	33	E	44
34	C	31	34	C	36
35	C	34	35	D	37
36	A	22	36	A	38
37	D	29	37	B	30
38	A	17	38	E	22

QUANTITATIVE ABILITY					
Section 2			Section 4		
Number	Answer	P+	Number	Answer	P+
1	B	95	1	A	93
2	A	83	2	B	84
3	A	81	3	C	84
4	C	70	4	C	81
5	C	78	5	C	82
6	D	77	6	B	83
7	B	74	7	B	76
8	A	71	8	C	74
9	A	72	9	A	76
10	D	83	10	D	64
11	A	74	11	A	75
12	B	72	12	D	49
13	B	62	13	B	66
14	D	24	14	D	19
15	C	19	15	C	20
16	C	84	16	C	93
17	B	80	17	C	78
18	D	72	18	A	66
19	C	71	19	E	68
20	E	63	20	D	64
21	B	91	21	D	89
22	A	89	22	A	81
23	C	74	23	C	71
24	D	61	24	B	76
25	C	43	25	A	36
26	C	60	26	C	60
27	E	52	27	D	50
28	A	55	28	B	45
29	A	44	29	E	41
30	D	36	30	B	41

ANALYTICAL ABILITY					
Section 3			Section 6		
Number	Answer	P+	Number	Answer	P+
1	C	76	1	E	76
2	B	90	2	B	87
3	E	55	3	D	75
4	E	52	4	C	85
5	E	55	5	E	79
6	C	75	6	E	66
7	B	60	7	B	87
8	A	89	8	C	84
9	B	88	9	D	80
10	B	63	10	B	59
11	D	72	11	C	46
12	D	57	12	A	71
13	E	31	13	A	18
14	B	75	14	E	44
15	A	27	15	A	66
16	E	53	16	A	66
17	C	58	17	E	50
18	A	41	18	C	50
19	A	58	19	D	39
20	A	37	20	A	37
21	E	18	21	A	27
22	C	40	22	E	32
23	D	66	23	D	75
24	B	24	24	A	61
25	D	22	25	D	23

*Estimated P+ for the group of examinees who took the GRE General Test in a recent three-year period.

SCORE CONVERSIONS FOR GENERAL TEST 27 ONLY AND THE PERCENTS BELOW*

Raw Score	Verbal Scaled Score	Verbal % Below	Quantitative Scaled Score	Quantitative % Below	Analytical Scaled Score	Analytical % Below
73-76	800	99				
72	780	99				
71	770	99				
70	750	98				
69	740	98				
68	730	97				
67	720	96				
66	710	96				
65	700	95				
64	690	94				
63	670	92				
62	660	91				
61	650	89				
60	640	88	800	98		
59	630	86	800	98		
58	620	84	800	98		
57	610	83	780	95		
56	600	81	760	93		
55	590	79	740	89		
54	580	77	730	87		
53	570	75	710	83		
52	560	73	700	81		
51	550	70	680	77		
50	540	67	670	75	800	99
49	530	65	660	73	800	99
48	520	62	640	69	800	99
47	510	59	630	66	790	98
46	490	54	620	64	780	98
45	480	51	610	62	760	96
44	470	48	590	57	750	96
43	460	45	580	55	730	94
42	450	42	570	52	720	93
41	450	42	560	50	710	91
40	440	39	550	48	690	89
39	430	36	540	45	680	87
38	420	34	530	43	660	84
37	410	30	520	40	650	82
36	400	27	500	35	630	77
35	390	25	490	33	620	75
34	380	23	480	30	600	70
33	370	21	470	29	590	68
32	360	17	460	26	570	62
31	360	17	450	24	560	59
30	350	15	440	22	540	53
29	340	13	430	20	530	51
28	340	13	420	18	510	44
27	330	11	400	15	500	42
26	310	8	390	13	490	39
25	300	7	380	12	470	33
24	290	5	370	10	460	31
23	280	4	360	9	440	25
22	270	3	350	8	430	24
21	270	3	340	7	410	19
20	260	2	330	6	400	17
19	250	2	320	5	390	15
18	240	1	310	4	370	12
17	230	1	290	3	360	10
16	200	1	280	2	340	8
15	200	1	270	2	330	6
14	200	1	250	1	310	5
13	200	1	240	1	300	4
12	200	1	220	1	290	3
11	200	1	210	1	270	2
10	200	1	200	1	250	1
9	200	1	200	1	230	1
8	200	1	200	1	220	1
0-7	200	1	200	1	200	1

* Percent scoring below the scaled score is based on the performance of 876,691 examinees who took the General Test between October 1, 1985, and September 30, 1988. This percent below information is used for score reports during the 1989-90 testing year.