GRE® Graduate Record Examinations®

Preparing for the GRE General Test

General Test

Sample Questions

with

Explanations

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 the 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, you 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.

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 your 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 you 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) contend (B) concentrate (C) imply (D) pretend (E) rebel

The best answer is (B). *Diffuse* means to permit or cause to spread out; only (B) 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 you are 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 use the various kinds of cues provided by syntax and grammar to recognize the overall meaning of a sentence. In deciding which of five words or sets of words can best be substituted for blank spaces in a sentence, you must analyze the relationships among the component parts of the incomplete sentence. You 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 your 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.

Some reading comprehension questions ask a question like the following: "Which of the following hypothetical situations most closely resembles the situation described in the passage?" Such questions are followed by a series of answer choices that are not explicitly connected to the content of the reading passage but instead present situations or scenarios from other realms, one of which parallels something in the passage in a salient way. You are asked to identify the one answer choice that is most clearly analogous to the situation presented in the passage.

In each edition of the General Test, there are three or more reading comprehension passages, each providing the basis for answering two or more questions. The passages are drawn from different subject matter areas, including 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.
- 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 7-11. 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 20-22 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 23-25 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 46-49, 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 28), 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 the abilities 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. The knowledge required for converting units in one system to units in another system is not 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.

If it is stated in a question that, for example, "of the 50 members of a club, 23 are botanists," the interpretation should be that 23 members of the club are botanists and that the other 27 members are not botanists.

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 $-4 < -3$.

NOTE: 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, $(2^3)^4 = 2^{12} = 4{,}096$

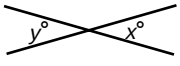
(e) $\frac{x^r}{x^s} = x^{r-s}$; for example, $\frac{4^2}{4^5} = 4^{2-5} = 4^{-3} = \frac{1}{4^3} = \frac{1}{64}$

GEOMETRY

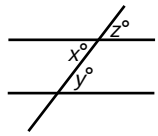
Questions classified as *geometry* include those involving the following topics: properties associated with parallel lines, circles, triangles (including isosceles, equilateral, and $30^\circ - 60^\circ - 90^\circ$), rectangles, other polygons, area, perimeter, volume, the Pythagorean Theorem, angle 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 below, $x = y$.

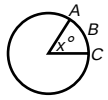


If two parallel lines are intersected by a third line, certain of the angles formed are equal; for example, in the figure



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

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



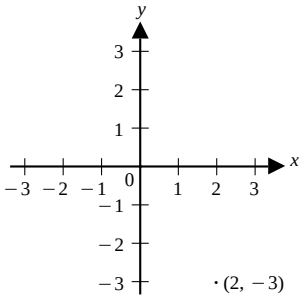
the length of arc ABC is $\frac{x}{360}$ times the circumference of the circle.

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).

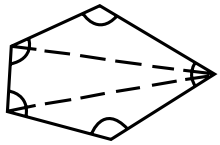
The coordinates of a point (x, y) give the location of the point in the rectangular coordinate plane; for example, the point $(2, -3)$ is located 2 units to the right of the y-axis and 3 units below the x-axis. Unless noted otherwise, the units used on the x-axis and the y-axis are the same.



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

The sides of a $45^\circ - 45^\circ - 90^\circ$ triangle are in the ratio $1 : 1 : \sqrt{2}$, and the sides of a $30^\circ - 60^\circ - 90^\circ$ 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).

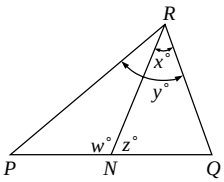
Directions for quantitative comparison questions and some examples with explanations follow.

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

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

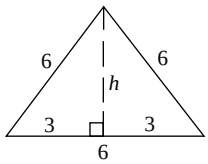
$\sqrt{100}$ denotes 10, the positive square root of 100. (The GRE follows the convention used in most standard text books: for any positive number x, $\sqrt{x}$ denotes the *positive* number whose square is x.) Since 10 is greater than 9.8, the best answer is (B). It is important not to confuse this 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?

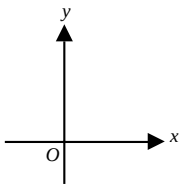
(A) 27 (B) 36 (C) 54 (D) 72 (E) 162

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.

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

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

(A) -9
(B) -11
(C) -19
(D) 19
(E) 21

By the definition,

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

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%

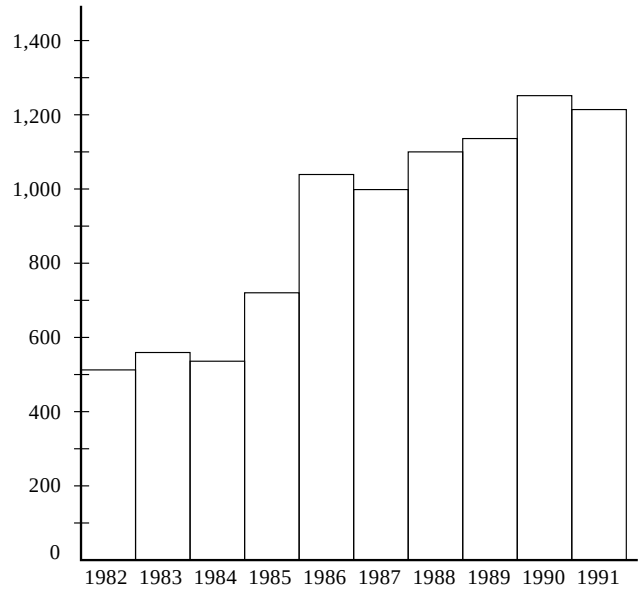
If A is the amount of sales for store T in 1978, then $0.08A$ is the amount of decrease and $A - 0.08A = 0.92A$ is the amount of sales for 1979. Therefore, the desired result can be obtained by dividing A by $0.92A$, which equals $\frac{1}{0.92}$, or approximately 109%. The best answer is (C).

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 the following two 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

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

Kale cannot be planted in the second year, since it cannot be planted two consecutive years. Corn cannot be planted in the second year either, since if it were, beans would have to be planted also, and then more than one of the vegetables planted in the first year would be repeated in the second year. So the remaining vegetables, beans, peas, and squash, are planted in the second year. NOTE THAT the first restriction does not prevent beans from being planted without corn, since the first restriction does not say anything about what happens in the event that the farmer does not plant corn. In the third year, corn and kale must be planted, since 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 counterarguments, 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. This is because 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.

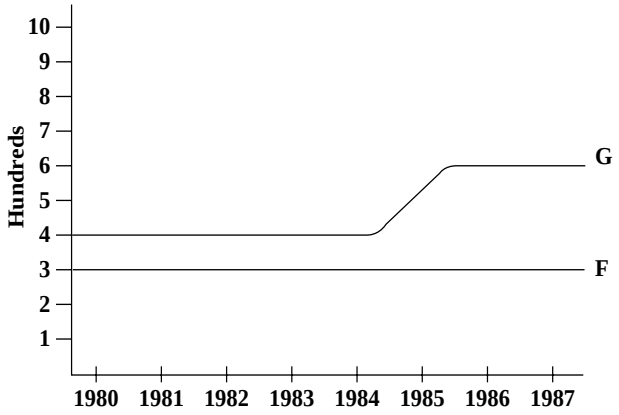
(B) is incorrect. The statements in the argument imply that it is relatively unlikely that life exists on other planets in our solar system, but those statements make no assumption that absolutely rules out the possibility that such life exists.

(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, most helps to 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, most 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*.