



**GRE**

GRADUATE RECORD EXAMINATIONS®

## **Practice General Test # 3**

Large Print (18 point) Edition

Section 5—Quantitative Reasoning

Section 6—Quantitative Reasoning



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## The Graduate Record Examinations<sup>®</sup> Practice General Test #3

### Instructions for the Verbal Reasoning and Quantitative Reasoning Sections

For your convenience, these instructions are included both in the test book for Sections 3 and 4, and in the test book for Sections 5 and 6. The instructions are the same in both locations.

As a reminder, standard timing for each section of the test is shown in the table below:

Section Order	Section Name	Standard Time
1	Analytical Writing: Analyze an Issue	30 minutes
2	Analytical Writing: Analyze an Argument	30 minutes
3	Verbal Reasoning	35 minutes
4	Verbal Reasoning	35 minutes
5	Quantitative Reasoning	40 minutes
6	Quantitative Reasoning	40 minutes

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## Important Notes

In the actual test, your scores for these sections will be determined by the number of questions you answer correctly. Nothing is subtracted from a score if you answer a question incorrectly. Therefore, to maximize your scores it is better for you to guess at an answer than not to respond at all. Work as rapidly as you can without losing accuracy. Do not spend too much time on questions that are too difficult for you. Go on to the other questions and come back to the difficult ones later.

Some or all of the passages in this test have been adapted from published material to provide the examinee with significant problems for analysis and evaluation. To make the passages suitable for testing purposes, the style, content, or point of view of the original may have been altered. The ideas contained in the passages do not necessarily represent the opinions of the Graduate Record Examinations Board or Educational Testing Service.

You may use a calculator in the Quantitative Reasoning sections only. You will be provided with a basic calculator and cannot use any other calculator, except as an approved accommodation.

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## Marking Your Answers

In the actual test, all answers must be marked in the test book. The following instructions describe how answers must be filled in.

Your answers will be hand-scored, so **make sure your marks are clear and unambiguous**. Examples of acceptable and unacceptable marks will be given with the sample questions.

## Question Formats

This practice test may include questions that would not be used in an actual test administered in an alternate format because they have been determined to be less suitable for presentation in such formats.

The questions in these sections have several different formats. A brief description of these formats and instructions for entering your answer choices are given below.

### Multiple-Choice Questions—Select One Answer Choice

These standard multiple-choice questions require you to select just one answer choice from a list of options. You will receive credit only if you mark the single correct answer choice and no other.

Example:

What city is the capital of France?

- A Rome
- B Paris
- C London
- D Cairo

Acceptable Marks

(A) Rome

(B) Paris

(C) London

(D) Cairo

(A) Rome

(X) Paris

(C) London

(D) Cairo

(A) Rome

(B) Paris

(C) London

(D) Cairo

(A) Rome

(scribble) Paris

(C) London

(D) Cairo

(A) Rome

(scribble) Paris

(C) London

(D) Cairo

(A) Rome

(●) Paris

(C) London

(D) Cairo

(A) Rome

(B) Paris

(C) London

(D) Cairo

Unacceptable Marks

<input type="radio"/> A	Rome	<input type="radio"/> A	Rome	<input type="radio"/> A	Rome
<del><input type="radio"/> B</del>	Paris	<input checked="" type="radio"/> B	Paris	<del><input type="radio"/> B</del>	Paris
<del><input type="radio"/> C</del>	London	<input type="radio"/> C	London	<del><input type="radio"/> C</del>	London
<input type="radio"/> D	Cairo	<input type="radio"/> D	Cairo	<input type="radio"/> D	Cairo

<input type="radio"/> A	Rome	<input type="radio"/> A	Rome	<del><input type="radio"/> A</del>	Rome
<del><input type="radio"/> B</del>	Paris	<input checked="" type="radio"/> B	Paris	<del><input type="radio"/> B</del>	Paris
<del><input type="radio"/> C</del>	London	<input type="radio"/> C	London	<del><input type="radio"/> C</del>	London
<input type="radio"/> D	Cairo	<input type="radio"/> D	Cairo	<del><input type="radio"/> D</del>	Cairo

If you change an answer, be sure that all previous marks are erased completely. Stray marks and incomplete erasures may be read as intended answers. Blank areas of the test book may be used for working out answers, but do not work out answers near the answer-entry areas. Scratch paper will not be provided, except as an approved accommodation.

**Multiple-Choice Questions—Select One or More Answer Choices**

Some of these questions specify how many answer choices you must select; others require you to select all that apply. In either case, to receive credit **all** of the correct answer choices must be marked. These questions are distinguished by the use of a square box to be marked to select an answer choice.

Example:

Select **all** that apply.

Which of the following countries are in Africa?

- A China
- B Congo
- C France
- D Kenya

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

Acceptable Marks

- A China
- B Congo
- C France
- D Kenya

- A China
- B Congo
- C France
- D Kenya

- A China
- B Congo
- C France
- D Kenya

- A China
- B Congo
- C France
- D Kenya

Unacceptable Marks

A China  
 B Congo  
 C France  
 D Kenya

## Column Format Questions

This question type presents the answer choices in columns. You must pick one answer choice from each column. You will receive credit only if you mark the correct answer choice **in each column**.

Example:

Complete the following sentence.

(i) \_\_\_\_\_ is the capital of (ii) \_\_\_\_\_.

Blank (i)	Blank (ii)
<input checked="" type="radio"/> Paris	<input type="radio"/> D Canada
<input type="radio"/> B Rome	<input checked="" type="radio"/> E France
<input type="radio"/> C Cairo	<input type="radio"/> F China

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

## Numeric Entry Questions

These questions require a number to be entered by circling entries in a grid. If you are not filling in your own answers, your scribe should be familiar with these instructions.

1. Your answer may be an integer, a decimal, or a fraction, and it may be negative.
2. Equivalent forms of the correct answer, such as 2.5 and 2.50, are all correct. Although fractions do not need to be reduced to lowest terms, they may need to be reduced to fit in the grid.
3. Enter the exact answer unless the question asks you to round your answer.
4. If a question asks for a fraction, the grid will have a built-in division slash (/). Otherwise, the grid will have a decimal point.
5. Start your answer in any column, space permitting. Circle no more than one entry in any column of the grid. Columns not needed should be left blank.
6. Write your answer in the boxes at the top of the grid and circle the corresponding entries. **You will receive credit only if your grid entries are clearly marked, regardless of the number written in the boxes at the top.**

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

**Examples of acceptable ways to use the grid:**

Integer answer: 502 (either position is correct)

		5	0	2			
—	.	.	.	.	.	.	.
	0	0	⓪	0	0	0	0
	1	1	1	1	1	1	1
	2	2	2	Ⓜ	2	2	2
	3	3	3	3	3	3	3
	4	4	4	4	4	4	4
	5	Ⓟ	5	5	5	5	5
	6	6	6	6	6	6	6
	7	7	7	7	7	7	7
	8	8	8	8	8	8	8
	9	9	9	9	9	9	9

				5	0	2	
—	.	.	.	.	.	.	.
	0	0	0	0	⓪	0	0
	1	1	1	1	1	1	1
	2	2	2	2	2	Ⓜ	2
	3	3	3	3	3	3	3
	4	4	4	4	4	4	4
	5	5	5	Ⓟ	5	5	5
	6	6	6	6	6	6	6
	7	7	7	7	7	7	7
	8	8	8	8	8	8	8
	9	9	9	9	9	9	9

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

Decimal Answer: -4.13

-				4	.	1	3
⊖	.	.	.	.	⊙	.	.
	0	0	0	0	0	0	0
	1	1	1	1	1	①	1
	2	2	2	2	2	2	2
	3	3	3	3	3	3	③
	4	4	4	④	4	4	4
	5	5	5	5	5	5	5
	6	6	6	6	6	6	6
	7	7	7	7	7	7	7
	8	8	8	8	8	8	8
	9	9	9	9	9	9	9

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

Fraction Answer:  $-\frac{2}{10}$

-		2		/	1	0	
⊖	0	0	0		0	⓪	0
	1	1	1		①	1	1
	2	②	2		2	2	2
	3	3	3		3	3	3
	4	4	4		4	4	4
	5	5	5		5	5	5
	6	6	6		6	6	6
	7	7	7		7	7	7
	8	8	8		8	8	8
	9	9	9		9	9	9

Section 5 follows. In an actual test, your supervisor will tell you when to continue the test.

**Section 5**  
**Quantitative Reasoning**  
**25 Questions**

**Directions:** For each question, indicate the best answer, using the directions given.

**Notes:** All numbers used are real numbers.

All figures are assumed to lie in a plane unless otherwise indicated.

Geometric figures, such as lines, circles, triangles, and quadrilaterals, **are not necessarily** drawn to scale. That is, you should **not** assume that quantities such as lengths and angle measures are as they appear in a figure. You should assume, however, that lines shown as straight are actually straight, points on a line are in the order shown, and more generally, all geometric objects are in the relative positions shown. For questions with geometric figures, you should base your answers on geometric reasoning, not on estimating or comparing quantities from how they are drawn in the geometric figure.

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

Coordinate systems, such as  $xy$ -planes and number lines, **are** drawn to scale; therefore, you can read, estimate, or compare quantities in such figures from how they are drawn in the coordinate system.

Graphical data presentations, such as bar graphs, circle graphs, and line graphs, **are** drawn to scale; therefore, you can read, estimate, or compare data values from how they are drawn in the graphical data presentation.

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

For each of Questions 1 to 9, compare Quantity A and Quantity B, using additional information centered above the two quantities if such information is given. Select one of the following four answer choices.

- (A) Quantity A is greater.
- (B) Quantity B is greater.
- (C) The two quantities are equal.
- (D) The relationship cannot be determined from the information given.

A symbol that appears more than once in a question has the same meaning throughout the question.

Quantity A

Quantity B

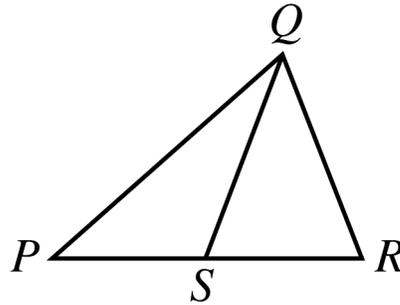
**Example 1:**       $(2)(6)$

$2 + 6$

The correct answer choice for Example 1 is A.  $(2)(6)$ , or 12, is greater than  $2 + 6$ , or 8.

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5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5



Quantity A

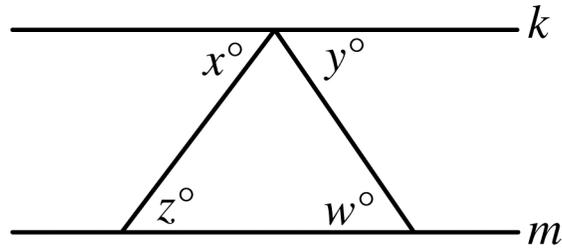
Quantity B

**Example 2:** The length of  $PS$

The length of  $SR$

The correct answer choice is D. The relationship between the lengths of  $PS$  and  $SR$  cannot be determined from the information given since equal measures cannot be assumed, even though the lengths of  $PS$  and  $SR$  appear to be equal in the figure.

---



Line  $k$  is parallel to line  $m$ .

Quantity A

Quantity B

1.  $x + y$   $w + z$

- (A) Quantity A is greater.  
(B) Quantity B is greater.  
(C) The two quantities are equal.  
(D) The relationship cannot be determined from the information given.

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

In a decimal number, a bar over one or more consecutive digits means that the pattern of digits under the bar repeats without end. For example,  $0.\overline{387} = 0.387387387 \dots$

Quantity A

Quantity B

2.

$0.\overline{717}$

$0.\overline{71}$

- (A) Quantity A is greater.
- (B) Quantity B is greater.
- (C) The two quantities are equal.
- (D) The relationship cannot be determined from the information given.

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

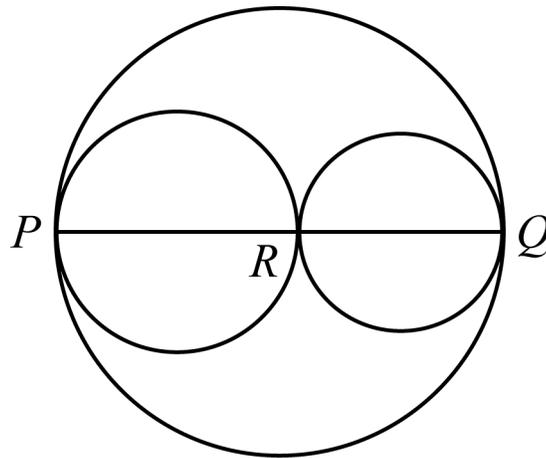
4 percent of  $s$  is equal to 3 percent of  $t$ , where  $s > 0$   
and  $t > 0$ .

Quantity A

Quantity B

3.  $s$   $t$

- (A) Quantity A is greater.
- (B) Quantity B is greater.
- (C) The two quantities are equal.
- (D) The relationship cannot be determined from the information given.



Three circles with their centers on line segment  $PQ$  are tangent at points  $P$ ,  $R$ , and  $Q$ , where point  $R$  lies on line segment  $PQ$ .

Quantity A

Quantity B

4. The circumference of the largest circle      The sum of the circumferences of the two smaller circles

- (A) Quantity A is greater.  
(B) Quantity B is greater.  
(C) The two quantities are equal.  
(D) The relationship cannot be determined from the information given.

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

$$rt < 0 < -r$$

Quantity A

Quantity B

5.  $t$   $0$

- (A) Quantity A is greater.
- (B) Quantity B is greater.
- (C) The two quantities are equal.
- (D) The relationship cannot be determined from the information given.

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

$$x > y$$

Quantity A

Quantity B

6.  $|x + y|$   $|x - y|$

- (A) Quantity A is greater.
- (B) Quantity B is greater.
- (C) The two quantities are equal.
- (D) The relationship cannot be determined from the information given.

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

In the  $xy$ -plane, the points  $(a, 0)$  and  $(0, b)$  are on the line whose equation is  $y = \frac{1}{2}x + 10$ .

Quantity A

Quantity B

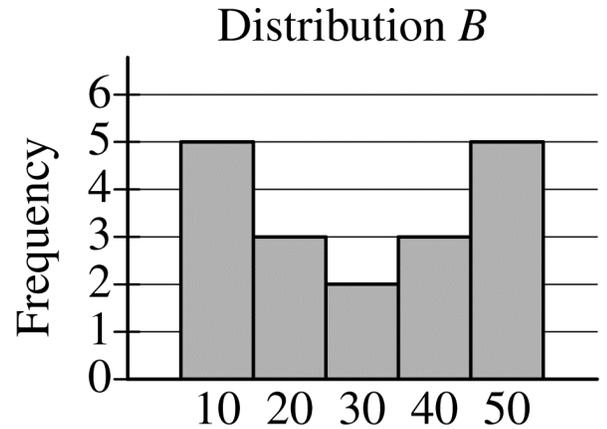
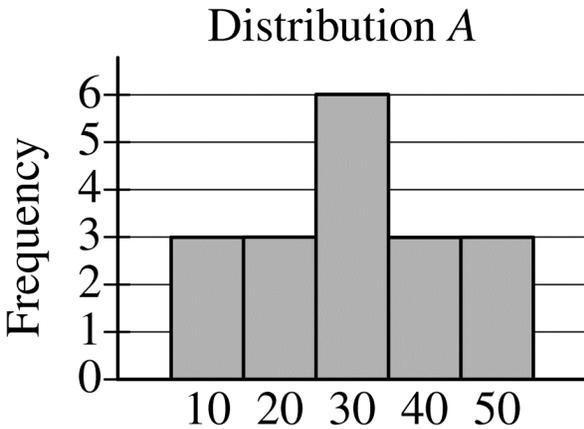
7.

$a$

$b$

- (A) Quantity A is greater.
- (B) Quantity B is greater.
- (C) The two quantities are equal.
- (D) The relationship cannot be determined from the information given.

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5



The frequency distributions shown represent two groups of data. Each of the data values is a multiple of 10.

Quantity A

Quantity B

8. The standard deviation of distribution *A*

The standard deviation of distribution *B*

- (A) Quantity A is greater.
- (B) Quantity B is greater.
- (C) The two quantities are equal.
- (D) The relationship cannot be determined from the information given.

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

One person is to be selected at random from a group of 25 people. The probability that the selected person will be a male is 0.44, and the probability that the selected person will be a male who was born before 1960 is 0.28.

Quantity A

Quantity B

9. The number of males in the group who were born in 1960 or later

4

- (A) Quantity A is greater.  
(B) Quantity B is greater.  
(C) The two quantities are equal.  
(D) The relationship cannot be determined from the information given.

**Questions 10 to 25 have several different formats, including both selecting answers from a list of answer choices and numeric entry. With each question, answer format instructions will be given.**

### **Numeric Entry Questions**

These questions require a number to be entered by circling entries in a grid. If you are not entering your own answers, your scribe should be familiar with these instructions.

1. Your answer may be an integer, a decimal, or a fraction, and it may be negative.
2. Equivalent forms of the correct answer, such as 2.5 and 2.50, are all correct. Although fractions do not need to be reduced to lowest terms, they may need to be reduced to fit in the grid.
3. Enter the exact answer unless the question asks you to round your answer.
4. If a question asks for a fraction, the grid will have a built-in division slash (/). Otherwise, the grid will have a decimal point.

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

5. Start your answer in any column, space permitting. Circle no more than one entry in any column of the grid. Columns not needed should be left blank.
6. Write your answer in the boxes at the top of the grid and circle the corresponding entries. **You will receive credit only if your grid entries are clearly marked, regardless of the number written in the boxes at the top.**

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

Examples of acceptable ways to use the grid:

Integer answer: 502 (either position is correct)

		5	0	2			
—	.	.	.	.	.	.	.
	0	0	⓪	0	0	0	0
	1	1	1	1	1	1	1
	2	2	2	Ⓜ	2	2	2
	3	3	3	3	3	3	3
	4	4	4	4	4	4	4
	5	Ⓟ	5	5	5	5	5
	6	6	6	6	6	6	6
	7	7	7	7	7	7	7
	8	8	8	8	8	8	8
	9	9	9	9	9	9	9

				5	0	2	
—	.	.	.	.	.	.	.
	0	0	0	0	⓪	0	0
	1	1	1	1	1	1	1
	2	2	2	2	2	Ⓜ	2
	3	3	3	3	3	3	3
	4	4	4	4	4	4	4
	5	5	5	Ⓟ	5	5	5
	6	6	6	6	6	6	6
	7	7	7	7	7	7	7
	8	8	8	8	8	8	8
	9	9	9	9	9	9	9

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

Decimal Answer: -4.13

-				4	.	1	3
⊖	.	.	.	.	⊙	.	.
	0	0	0	0	0	0	0
	1	1	1	1	1	①	1
	2	2	2	2	2	2	2
	3	3	3	3	3	3	③
	4	4	4	④	4	4	4
	5	5	5	5	5	5	5
	6	6	6	6	6	6	6
	7	7	7	7	7	7	7
	8	8	8	8	8	8	8
	9	9	9	9	9	9	9

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

Fraction Answer:  $-\frac{2}{10}$

-		2		/	1	0	
⊖	0	0	0		0	⓪	0
	1	1	1		①	1	1
	2	②	2		2	2	2
	3	3	3		3	3	3
	4	4	4		4	4	4
	5	5	5		5	5	5
	6	6	6		6	6	6
	7	7	7		7	7	7
	8	8	8		8	8	8
	9	9	9		9	9	9

This question does not have any answer choices; it is a numeric entry question. To answer this question, enter a number by circling entries in the grid provided below. The number can include a decimal point, and can be positive, negative, or zero. The number entered cannot be a fraction.

10. At Company *Y*, the ratio of the number of female employees to the number of male employees is 3 to 2. If there are 150 female employees at the company, how many male employees are there at the company?

								male employees
—	.	.	.	.	.	.	.	
	0	0	0	0	0	0	0	
	1	1	1	1	1	1	1	
	2	2	2	2	2	2	2	
	3	3	3	3	3	3	3	
	4	4	4	4	4	4	4	
	5	5	5	5	5	5	5	
	6	6	6	6	6	6	6	
	7	7	7	7	7	7	7	
	8	8	8	8	8	8	8	
	9	9	9	9	9	9	9	

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

This question has five answer choices. Select the best one of the answer choices given.

11. If  $\frac{a-b}{a+b} = 2$  and  $b = 1$ , what is the value of  $a$ ?

(A) 1

(B) 0

(C) -1

(D) -2

(E) -3

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

This question has five answer choices. Select the best one of the answer choices given.

12. The floor space in a certain market is rented for \$15 per 30 square feet for one day. In the market, Alice rented a rectangular floor space that measured 8 feet by 15 feet, and Betty rented a rectangular floor space that measured 15 feet by 20 feet. If each woman rented her floor space for one day, how much more did Betty pay than Alice?
- (A) \$27
- (B) \$36
- (C) \$54
- (D) \$90
- (E) \$180

This question has five answer choices. Select the best one of the answer choices given.

13. A business owner obtained a \$6,000 loan at a simple annual interest rate of  $r$  percent in order to purchase a computer. After one year, the owner made a single payment of \$6,840 to repay the loan, including the interest. What is the value of  $r$  ?
- (A) 7.0
  - (B) 8.4
  - (C) 12.3
  - (D) 14.0
  - (E) 16.8

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

This question does not have any answer choices; it is a numeric entry question. To answer this question enter a fraction by circling entries in the grid provided on the following page. The fraction can be positive or negative. Neither the numerator nor the denominator of the fraction can include a decimal point. The fraction does not have to be in lowest terms.

List  $L$ : 2,  $x$ ,  $y$

List  $M$ : 1, 2, 3,  $x$ ,  $y$

14. If the average (arithmetic mean) of the 3 numbers in list  $L$  is  $\frac{10}{3}$ , what is the average of the 5 numbers in list  $M$ ?

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

Give your answer as a fraction.

				/			
-	0	0	0		0	0	0
	1	1	1		1	1	1
	2	2	2		2	2	2
	3	3	3		3	3	3
	4	4	4		4	4	4
	5	5	5		5	5	5
	6	6	6		6	6	6
	7	7	7		7	7	7
	8	8	8		8	8	8
	9	9	9		9	9	9

This question has three answer choices. Select **all** the answer choices that apply. The correct answer to a question of this type could consist of as few as one, or as many as all three of the answer choices.

15. Which of the following inequalities have at least one positive solution and at least one negative solution?

Indicate **all** such inequalities.

A  $\frac{5}{3}x < x$

B  $x^3 < x$

C  $x - 6 < x - 7$

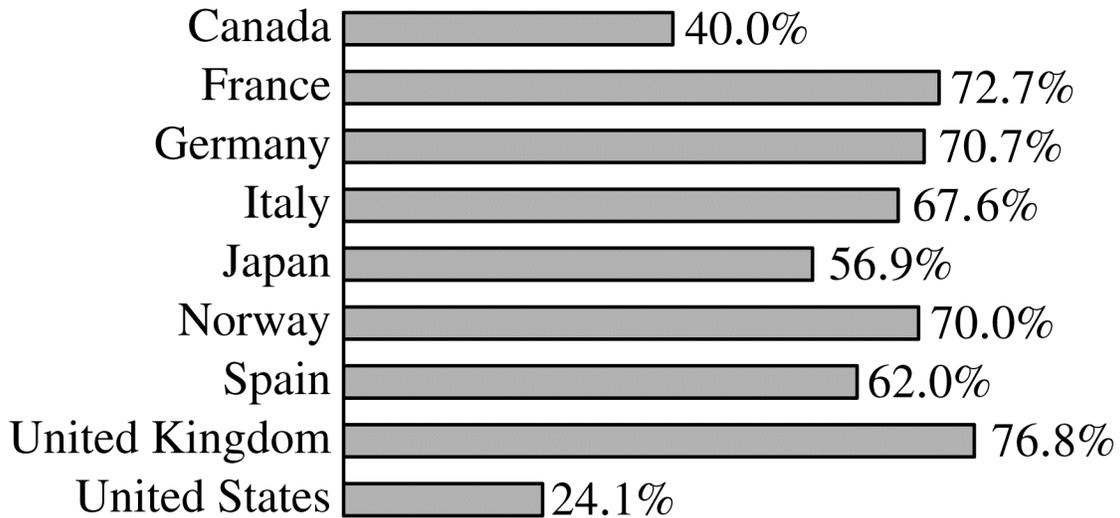
5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

This question has five answer choices. Select the best one of the answer choices given.

16. If  $(5^{5x})(25) = 5^n$ , where  $n$  and  $x$  are integers, what is the value of  $n$  in terms of  $x$ ?
- (A)  $5x + 1$
  - (B)  $5x + 2$
  - (C)  $5x + 5$
  - (D)  $10x$
  - (E)  $10x + 2$

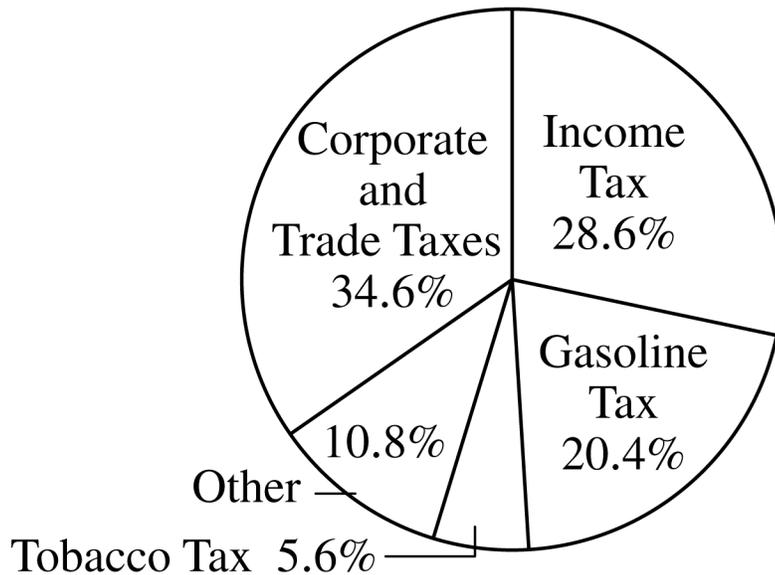
Questions 17 to 20 are based on the following data.

Gasoline Tax Revenue as a Percent of Total Retail Gasoline Sales\* in 2000



\*Total retail sales include tax.

Distribution of Germany's Total Tax Revenue in 2000



This question has five answer choices. Select the best one of the answer choices given.

17. What is the median of the percent values representing gasoline tax revenue as a percent of total retail gasoline sales for the nine countries listed in the bar graph?
- (A) 67.6%
  - (B) 68.0%
  - (C) 70.0%
  - (D) 70.7%
  - (E) 72.7%

This question has three answer choices. Select **all** the answer choices that apply. The correct answer to a question of this type could consist of as few as one, or as many as all three of the answer choices.

18. Based on the information given, which of the following statements must be true?

Indicate **all** such statements.

- A** In 2000 France's gasoline tax revenue as a percent of its total tax revenue was greater than 20.4 percent.
- B** In 2000 the price per gallon of gasoline was greater in Norway than it was in Spain.
- C** In 2000 Germany's gasoline tax revenue was more than 3 times its tobacco tax revenue.

This question has five answer choices. Select the best one of the answer choices given.

19. In 2000 the amount of Germany's gasoline tax revenue was approximately what percent less than the amount of its income tax revenue?
- (A) 10%
  - (B) 20%
  - (C) 30%
  - (D) 40%
  - (E) 50%

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

This question has five answer choices. Select the best one of the answer choices given.

20. If Germany's total tax revenue in 2000 was approximately \$170 billion, approximately what was the amount of the total retail gasoline sales in Germany that year?
- (A) \$10 billion
  - (B) \$20 billion
  - (C) \$30 billion
  - (D) \$40 billion
  - (E) \$50 billion

This question has five answer choices. Select the best one of the answer choices given.

21. Of the 180 judges appointed by a certain President, 30 percent were women and 25 percent were from minority groups. If  $\frac{1}{9}$  of the women appointed were from minority groups, how many of the judges appointed were neither women nor from minority groups?
- (A) 75
- (B) 81
- (C) 87
- (D) 93
- (E) 99

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

This question has five answer choices. Select the best one of the answer choices given.

22. If an integer is divisible by both 8 and 15, then the integer also must be divisible by which of the following?

- (A) 16
- (B) 24
- (C) 32
- (D) 36
- (E) 45

5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5

This question has five answer choices. Select the best one of the answer choices given.

23. A certain experiment has three possible outcomes. The outcomes are mutually exclusive and have probabilities  $p$ ,  $\frac{p}{2}$ , and  $\frac{p}{4}$ , respectively. What is the value of  $p$ ?

(A)  $\frac{1}{7}$

(B)  $\frac{2}{7}$

(C)  $\frac{3}{7}$

(D)  $\frac{4}{7}$

(E)  $\frac{5}{7}$

This question has six answer choices. Select **all** the answer choices that apply. The correct answer to a question of this type could consist of as few as one, or as many as all six of the answer choices.

24. In triangle  $ABC$ , the measure of angle  $B$  is  $90^\circ$ , the length of side  $AB$  is 4, and the length of side  $BC$  is  $x$ . If the length of hypotenuse  $AC$  is between 4 and 8, which of the following could be the value of  $x$ ?

Indicate **all** such values.

A 1

B 2

C 3

D 4

E 5

F 6

This question has five answer choices. Select the best one of the answer choices given.

25. Each month, a certain manufacturing company's total expenses are equal to a fixed monthly expense plus a variable expense that is directly proportional to the number of units produced by the company during that month. If the company's total expenses for a month in which it produces 20,000 units are \$570,000, and the total expenses for a month in which it produces 25,000 units are \$705,000, what is the company's fixed monthly expense?
- (A) \$27,000
  - (B) \$30,000
  - (C) \$67,500
  - (D) \$109,800
  - (E) \$135,000

**5 5 ♦ 5 ♦ 5 ♦ 5 ♦ 5 5**

**STOP**

**In an actual test, once you complete a section you may not return to it.**

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**Section 6**  
**Quantitative Reasoning**  
**25 Questions**

**Directions:** For each question, indicate the best answer, using the directions given.

**Notes:** All numbers used are real numbers.

All figures are assumed to lie in a plane unless otherwise indicated.

Geometric figures, such as lines, circles, triangles, and quadrilaterals, **are not necessarily** drawn to scale.

That is, you should **not** assume that quantities such as lengths and angle measures are as they appear in a figure. You should assume, however, that lines shown as straight are actually straight, points on a line are in the order shown, and more generally, all geometric objects are in the relative positions shown. For questions with geometric figures, you should base your answers on geometric reasoning, not on estimating or comparing quantities from how they are drawn in the geometric figure.

Coordinate systems, such as  $xy$ -planes and number lines, **are** drawn to scale; therefore, you can read, estimate, or compare quantities in such figures from how they are drawn in the coordinate system.

Graphical data presentations, such as bar graphs, circle graphs, and line graphs, **are** drawn to scale; therefore, you can read, estimate, or compare data values from how they are drawn in the graphical data presentation.

For each of Questions 1 to 9, compare Quantity A and Quantity B, using additional information centered above the two quantities if such information is given. Select one of the following four answer choices.

- (A) Quantity A is greater.
- (B) Quantity B is greater.
- (C) The two quantities are equal.
- (D) The relationship cannot be determined from the information given.

A symbol that appears more than once in a question has the same meaning throughout the question.

Quantity A

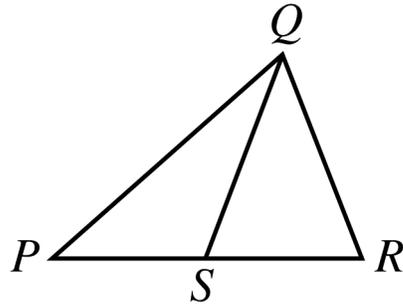
Quantity B

**Example 1:**       $(2)(6)$

$2 + 6$

The correct answer choice for Example 1 is A.  $(2)(6)$ , or 12, is greater than  $2 + 6$ , or 8.

-----



Quantity A

Quantity B

**Example 2:** The length of  $PS$

The length of  $SR$

The correct answer choice is D. The relationship between the lengths of  $PS$  and  $SR$  cannot be determined from the information given since equal measures cannot be assumed, even though the lengths of  $PS$  and  $SR$  appear to be equal in the figure.

The length of each side of equilateral triangle  $T$  is 6 times the length of each side of equilateral triangle  $X$ .

Quantity A

Quantity B

1. The ratio of the length of one side of  $T$  to the length of another side of  $T$
- The ratio of the length of one side of  $X$  to the length of another side of  $X$
- (A) Quantity A is greater.
- (B) Quantity B is greater.
- (C) The two quantities are equal.
- (D) The relationship cannot be determined from the information given.

Of 30 theater tickets sold, 20 tickets were sold at prices between \$10 and \$30 each and 10 tickets were sold at prices between \$40 and \$60 each.

Quantity A

Quantity B

2. The average (arithmetic mean) of the prices of the 30 tickets
- \$50

- (A) Quantity A is greater.
- (B) Quantity B is greater.
- (C) The two quantities are equal.
- (D) The relationship cannot be determined from the information given.

$$x > 1$$

Quantity A

Quantity B

3.

$$\frac{x}{x+1}$$

$$\frac{-x}{1-x}$$

- (A) Quantity A is greater.
- (B) Quantity B is greater.
- (C) The two quantities are equal.
- (D) The relationship cannot be determined from the information given.



$T$  is a list of 100 different numbers that are greater than 0 and less than 50. The number  $x$  is greater than 60 percent of the numbers in  $T$ , and the number  $y$  is greater than 40 percent of the numbers in  $T$ .

Quantity A

Quantity B

5.  $x - y$  20

- (A) Quantity A is greater.
- (B) Quantity B is greater.
- (C) The two quantities are equal.
- (D) The relationship cannot be determined from the information given.

$n$  is a positive integer.

Quantity A

Quantity B

6. The remainder when  $n$  is divided by 5      The remainder when  $n + 10$  is divided by 5
- (A) Quantity A is greater.  
(B) Quantity B is greater.  
(C) The two quantities are equal.  
(D) The relationship cannot be determined from the information given.



$k$  is an integer for which  $\frac{1}{2^{1-k}} < \frac{1}{8}$ .

Quantity A

Quantity B

8.  $k$   $-2$

- (A) Quantity A is greater.
- (B) Quantity B is greater.
- (C) The two quantities are equal.
- (D) The relationship cannot be determined from the information given.

$n$  is an integer greater than 0.

Quantity A

Quantity B

9. The number of different prime factors of  $9n$                       The number of different prime factors of  $8n$
- (A) Quantity A is greater.  
(B) Quantity B is greater.  
(C) The two quantities are equal.  
(D) The relationship cannot be determined from the information given.

**Questions 10 to 25 have several different formats, including both selecting answers from a list of answer choices and numeric entry. With each question, answer format instructions will be given.**

### **Numeric Entry Questions**

These questions require a number to be entered by circling entries in a grid. If you are not entering your own answers, your scribe should be familiar with these instructions.

1. Your answer may be an integer, a decimal, or a fraction, and it may be negative.
2. Equivalent forms of the correct answer, such as 2.5 and 2.50, are all correct. Although fractions do not need to be reduced to lowest terms, they may need to be reduced to fit in the grid.
3. Enter the exact answer unless the question asks you to round your answer.
4. If a question asks for a fraction, the grid will have a built-in division slash (/). Otherwise, the grid will have a decimal point.

5. Start your answer in any column, space permitting. Circle no more than one entry in any column of the grid. Columns not needed should be left blank.
6. Write your answer in the boxes at the top of the grid and circle the corresponding entries. **You will receive credit only if your grid entries are clearly marked, regardless of the number written in the boxes at the top.**

**Examples of acceptable ways to use the grid:**

Integer answer: 502 (either position is correct)

		<b>5</b>	<b>0</b>	<b>2</b>			
—	.	.	.	.	.	.	.
	0	0	⓪	0	0	0	0
	1	1	1	1	1	1	1
	2	2	2	Ⓜ	2	2	2
	3	3	3	3	3	3	3
	4	4	4	4	4	4	4
	5	Ⓟ	5	5	5	5	5
	6	6	6	6	6	6	6
	7	7	7	7	7	7	7
	8	8	8	8	8	8	8
	9	9	9	9	9	9	9

				<b>5</b>	<b>0</b>	<b>2</b>	
—	.	.	.	.	.	.	.
	0	0	0	0	⓪	0	0
	1	1	1	1	1	1	1
	2	2	2	2	2	Ⓜ	2
	3	3	3	3	3	3	3
	4	4	4	4	4	4	4
	5	5	5	Ⓟ	5	5	5
	6	6	6	6	6	6	6
	7	7	7	7	7	7	7
	8	8	8	8	8	8	8
	9	9	9	9	9	9	9

Decimal Answer: -4.13

-				4	.	1	3
⊖	.	.	.	.	⊙	.	.
	0	0	0	0	0	0	0
	1	1	1	1	1	Ⓛ	1
	2	2	2	2	2	2	2
	3	3	3	3	3	3	ⓓ
	4	4	4	ⓔ	4	4	4
	5	5	5	5	5	5	5
	6	6	6	6	6	6	6
	7	7	7	7	7	7	7
	8	8	8	8	8	8	8
	9	9	9	9	9	9	9

Fraction Answer:  $-\frac{2}{10}$

-		2		/	1	0	
⊖	0	0	0		0	⓪	0
	1	1	1		①	1	1
	2	②	2		2	2	2
	3	3	3		3	3	3
	4	4	4		4	4	4
	5	5	5		5	5	5
	6	6	6		6	6	6
	7	7	7		7	7	7
	8	8	8		8	8	8
	9	9	9		9	9	9

This question has five answer choices. Select the best one of the answer choices given.

10. Working at their respective constant rates, machine I makes 240 copies in 8 minutes and machine II makes 240 copies in 5 minutes. At these rates, how many more copies does machine II make in 4 minutes than machine I makes in 6 minutes?

- (A) 10
- (B) 12
- (C) 15
- (D) 20
- (E) 24

This question does not have any answer choices; it is a numeric entry question. To answer this question, enter a number by circling entries in the grid provided below. The number can include a decimal point, and can be positive, negative, or zero. The number entered cannot be a fraction.

11. Among the people attending a convention in Europe, 32 percent traveled from Asia and 45 percent of those who traveled from Asia are women. What percent of the people at the convention are women who traveled from Asia?

								%
—	.	.	.	.	.	.	.	
	0	0	0	0	0	0	0	
	1	1	1	1	1	1	1	
	2	2	2	2	2	2	2	
	3	3	3	3	3	3	3	
	4	4	4	4	4	4	4	
	5	5	5	5	5	5	5	
	6	6	6	6	6	6	6	
	7	7	7	7	7	7	7	
	8	8	8	8	8	8	8	
	9	9	9	9	9	9	9	

This question has five answer choices. Select the best one of the answer choices given.

12. In the  $xy$ -plane, points  $R$  and  $S$  have coordinates  $(-2, 1)$  and  $(4, -7)$ , respectively. If point  $P$  is the midpoint of line segment  $RS$ , what are the coordinates of point  $P$ ?

(A)  $(-1, -3)$

(B)  $(1, -4)$

(C)  $(1, -3)$

(D)  $(2, -4)$

(E)  $(3, -4)$

This question has five answer choices. Select the best one of the answer choices given.

13. Steve's property tax is \$140 less than Patricia's property tax. If Steve's property tax is \$1,960, then Steve's property tax is what percent less than Patricia's property tax, to the nearest 0.1 percent?
- (A) 6.7%
  - (B) 7.1%
  - (C) 7.5%
  - (D) 7.9%
  - (E) 8.3%

This question has five answer choices. Select the best one of the answer choices given.

14. A base of a triangle has length  $b$ , the altitude corresponding to the base has length  $h$ , and  $b = 2h$ . Which of the following expresses the area of the triangle, in terms of  $h$  ?

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

(B)  $\frac{3}{4}h^2$

(C)  $h^2$

(D)  $\frac{3}{2}h^2$

(E)  $2h^2$

This question has five answer choices. Select the best one of the answer choices given.

15. How many different two-digit positive integers are there in which the tens digit is greater than 6 and the units digit is less than 4 ?
- (A) 7
  - (B) 9
  - (C) 10
  - (D) 12
  - (E) 24

This question has four answer choices. Select **all** the answer choices that apply. The correct answer to a question of this type could consist of as few as one, or as many as all four of the answer choices.

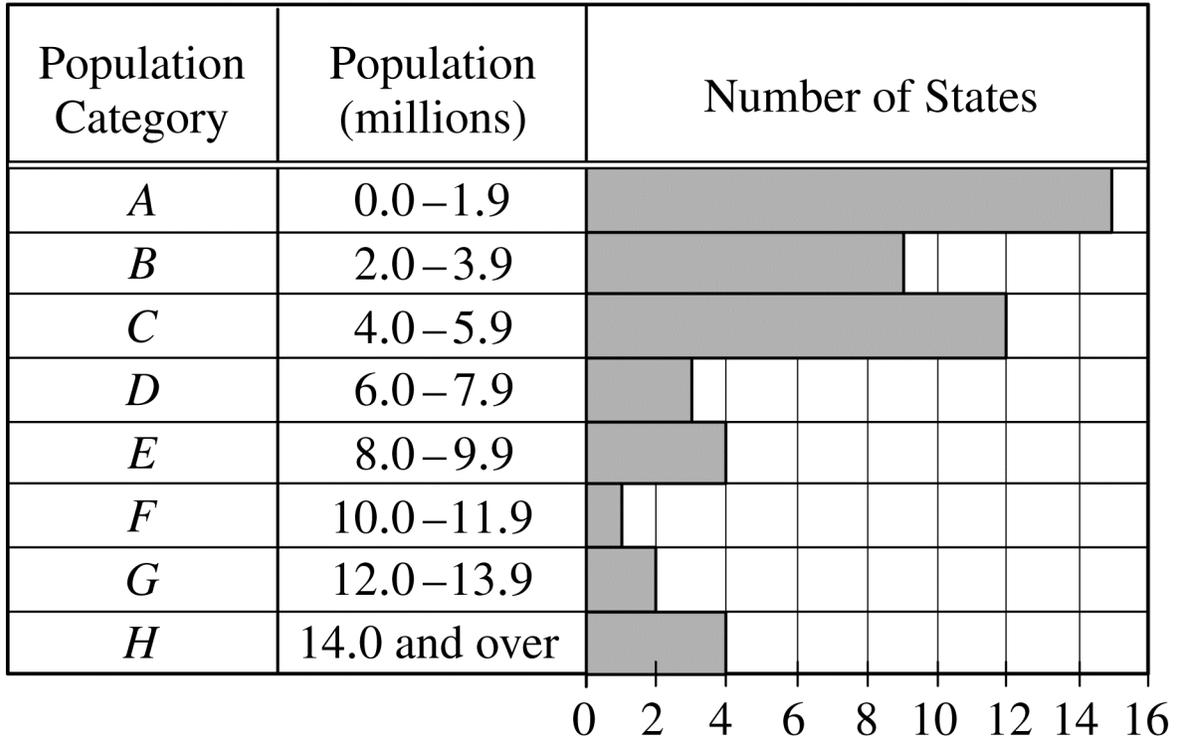
16. Chris entered a number in his calculator and erroneously multiplied the number by 2,073 instead of 2.073, getting an incorrect product. Which of the following is a single operation that Chris could perform on his calculator to correct the error?

Indicate **all** such operations.

- A Multiply the incorrect product by 0.001
- B Divide the incorrect product by 0.001
- C Multiply the incorrect product by 1,000
- D Divide the incorrect product by 1,000

Questions 17 to 20 are based on the following data.

Distribution of the 50 States of the United States  
by Population,\* 2000



\*Population of each state is rounded to the nearest 0.1 million.

This question has five answer choices. Select the best **one** of the answer choices given.

17. How many of the 50 states were in the five population categories from *A* through *E* ?

(A) 47

(B) 43

(C) 35

(D) 20

(E) 19

This question has five answer choices. Select the best one of the answer choices given.

18. In 2000 the population of West Virginia was 1.8 million. If the ratio of the population of Georgia to that of West Virginia was 9 to 2, in which population category was Georgia?
- (A) Category *B*
  - (B) Category *C*
  - (C) Category *D*
  - (D) Category *E*
  - (E) Category *F*

This question has five answer choices. Select the best one of the answer choices given.

19. The number of states in the two population categories  $C$  and  $D$  was approximately what percent greater than the number in the four population categories from  $E$  through  $H$ ?
- (A) 36%
  - (B) 33%
  - (C) 30%
  - (D) 27%
  - (E) 20%

This question has five answer choices. Select the best one of the answer choices given.

20. The median of the 50 state populations was in which population category?
- (A) Category *A*
  - (B) Category *B*
  - (C) Category *C*
  - (D) Category *D*
  - (E) Category *E*

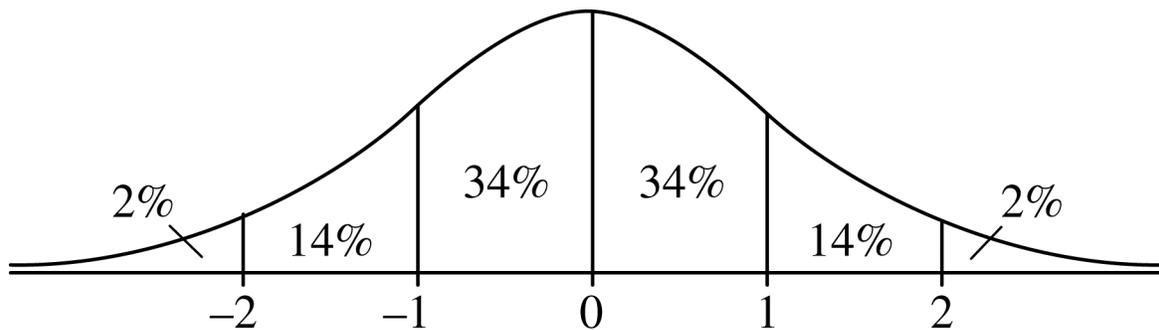
This question does not have any answer choices; it is a numeric entry question. To answer this question, enter a number by circling entries in the grid provided below. The number can include a decimal point, and can be positive, negative, or zero. The number entered cannot be a fraction.

21. If  $\sqrt[3]{x} = 3$  and  $x = \sqrt{y}$ , what is the value of  $y$ ?

$y =$

-	.	.	.	.	.	.	.
	0	0	0	0	0	0	0
	1	1	1	1	1	1	1
	2	2	2	2	2	2	2
	3	3	3	3	3	3	3
	4	4	4	4	4	4	4
	5	5	5	5	5	5	5
	6	6	6	6	6	6	6
	7	7	7	7	7	7	7
	8	8	8	8	8	8	8
	9	9	9	9	9	9	9

This question has five answer choices. Select the best **one** of the answer choices given.



22. The figure shows the standard normal distribution, with mean 0 and standard deviation 1, including approximate percents of the distribution corresponding to the six regions shown.

Ian rode the bus to work last year. His travel times to work were approximately normally distributed, with a mean of 35 minutes and a standard deviation of 5 minutes. According to the figure shown, approximately what percent of Ian's travel times to work last year were less than 40 minutes?

- (A) 14%
- (B) 34%
- (C) 60%
- (D) 68%
- (E) 84%

This question has five answer choices. Select the best one of the answer choices given.

23. For all integers  $x$ , the function  $f$  is defined as follows.

$$f(x) = \begin{cases} x - 1 & \text{if } x \text{ is even} \\ x + 1 & \text{if } x \text{ is odd} \end{cases}$$

If  $a$  and  $b$  are integers and  $f(a) + f(b) = a + b$ , which of the following statements must be true?

- (A)  $a = b$
- (B)  $a = -b$
- (C)  $a + b$  is odd.
- (D) Both  $a$  and  $b$  are even.
- (E) Both  $a$  and  $b$  are odd.

This question has five answer choices. Select the best one of the answer choices given.

24. If  $y^{-2} + 2y^{-1} - 15 = 0$ , which of the following could be the value of  $y$ ?

(A) 3

(B)  $\frac{1}{5}$

(C)  $-\frac{1}{5}$

(D)  $-\frac{1}{3}$

(E) -5

This question has six answer choices. Select **all** the answer choices that apply. The correct answer to a question of this type could consist of as few as one, or as many as all six of the answer choices.

3.7, 4.1,  $a$ , 8.5, 9.2,  $2a$

25. The six numbers shown are listed in increasing order. Which of the following values could be the range of the six numbers?

Indicate **all** such values.

- A 4.0
- B 5.2
- C 7.3
- D 11.6
- E 12.9
- F 14.1

**STOP**

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**NO TEST MATERIAL ON THIS PAGE**

