

SECTION 5

Quantitative Reasoning (Time—40 minutes)

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 by sight or by measurement.

Coordinate systems, such as xy -planes and number lines, are drawn to scale; therefore, you can read, estimate, or compare quantities in such figures by sight or by measurement.

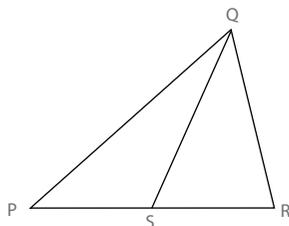
Graphical data presentations, such as bar graphs, circle graphs, and line graphs, are drawn to scale; therefore, you can read, estimate, or compare data values by sight or by measurement.

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 and fill in the corresponding circle to the right of the question.

- (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.

Example 1	Quantity A	Quantity B	Correct Answer
	(2) (6)	2+6	<input checked="" type="radio"/> A <input type="radio"/> B <input type="radio"/> C <input type="radio"/> D



Example 2:-

Quantity A
PS

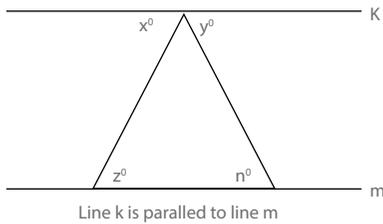
Quantity B
SR

Correct Answer

A B C **D**

(Since equal lengths cannot be assumed, even though PS and SR appear equal)

- (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.



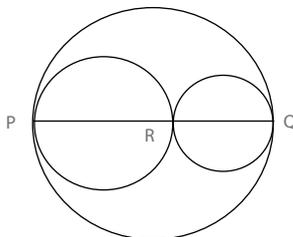
1. Quantity A Quantity B
 $x+y$ $w+z$ A B C D

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, $\overline{0.387} = .387387387 \dots$

2. Quantity A Quantity B
 0.717 0.71 A B C D

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

3. Quantity A Quantity B
 s t A B C D



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 .

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.

- | | | | |
|----|---|-------------------|---------|
| | <u>Quantity A</u> | <u>Quantity B</u> | |
| 9. | The number of males in the group who were born in 1960 or later | 4 | A B C D |

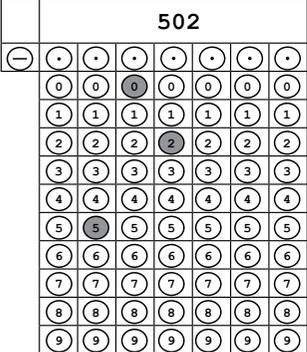
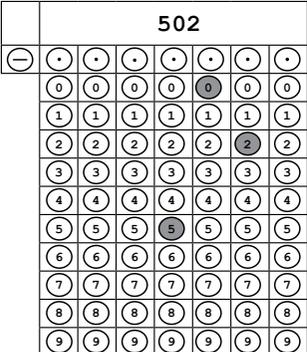
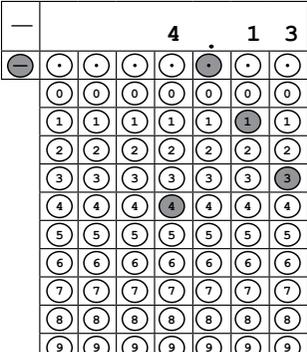
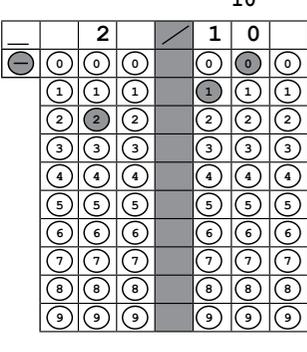
Questions 10 to 25 have several different formats. Unless otherwise directed, select a single answer choice. For Numeric Entry questions, follow the instructions below.

Numeric Entry Questions

To answer these questions, enter a number by filling in circles in a grid.

- Your answer may be an integer, a decimal, or a fraction, and it may be negative.
- Equivalent forms of the correct answer, such as 2.5 and 2.50, are all correct. Fractions do not need to be reduced to lowest terms, though you may need to reduce your fraction to fit in the grid.
- Enter the exact answer unless the question asks you to round your answer.
- If a question asks for a fraction, the grid will have a built-in division slash (/). Otherwise, the grid will have a decimal point available.
- Start your answer in any column, space permitting. Fill in no more than one circle in any column of the grid. Columns not needed should be left blank.
- Write your answer in the boxes at the top of the grid and fill in the corresponding circles. You will receive credit only if the circles are filled in correctly, 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)	Decimal answer: -4.13	Fraction answer: $-\frac{2}{10}$
			

For the following question, use the grid to enter your answer.

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 company, how many male employees are there at the company?

For the following question, select all the answer choices that apply.

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

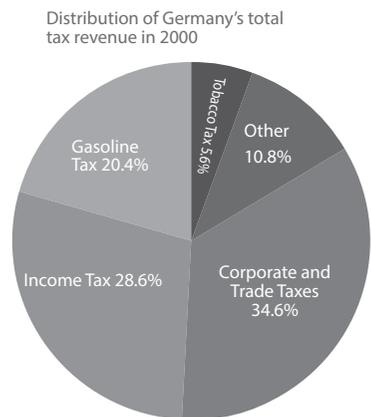
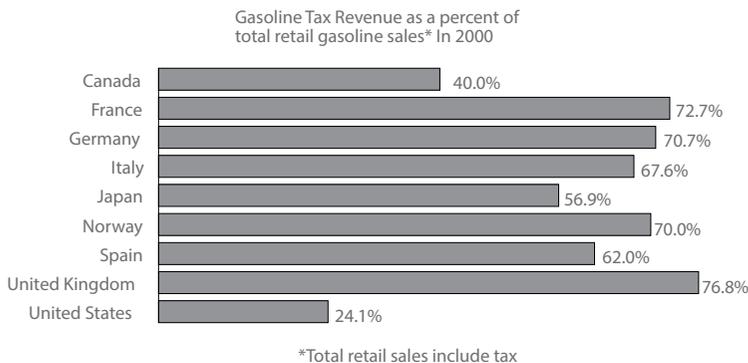
Indicate all such inequalities.

A $\frac{5}{3}x < x$ B $x^3 < x$ C $x - 6 < x - 7$

16. If $(5^x)(25) = 5^n$, 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.



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%

For the following question, select all the answer choices that apply.

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.

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%

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
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
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
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 $\frac{5}{7}$

For the following question, select all the answer choices that apply.

24. In triangle ABC, the measure of angle B is 90° , 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
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

SECTION 6

Quantitative Reasoning (Time—40 minutes)

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

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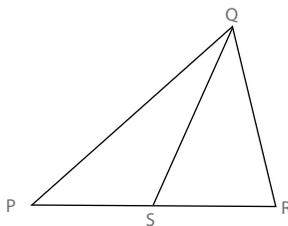
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A symbol that appears more than once in a question has the same meaning throughout the question.

Example 1: Quantity A Quantity B A B C D
 (2) (6) 2+6



- | | | | |
|----|---|--|---------|
| 6. | <u>Quantity A</u> | <u>Quantity B</u> | |
| | The remainder when
n is divided by 5 | The remainder when
$n+10$ is divided by 5 | A B C D |

A right circular cylinder with radius 2 inches has volume 15 cubic inches.

- | | | | |
|----|-------------------------------|-------------------|---------|
| 7. | <u>Quantity A</u> | <u>Quantity B</u> | |
| | The height of the
cylinder | 2 inches | A B C D |

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

- | | | | |
|----|-------------------|-------------------|---------|
| 8. | <u>Quantity A</u> | <u>Quantity B</u> | |
| | k | -2 | A B C D |

n is an integer greater than 0.

- | | | | |
|----|---|---|---------|
| 9. | <u>Quantity A</u> | <u>Quantity B</u> | |
| | The number of different
prime factors of 9_n | The number of different
prime factors of 8_n | A B C D |

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Numeric Entry Questions

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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 $2h^2$
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

For the following question, select all the answer choices that apply.

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 Category	Population(millions)	Number of States
A	0.0-1.9	15
B	2.0-3.9	9
C	4.0-5.9	12
D	6.0-7.9	4
E	8.0-9.9	4
F	10.0-11.9	2
G	12.0-13.9	2
H	14.0 and over	3

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

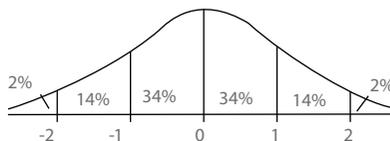
17. How many of the 50 states were in the five population categories from A through E?
- A 47
 - B 43
 - C 35
 - D 20
 - E 19
18. In 2000 the population of West Virginia was 1.8 million. If the ratio of the population of Georgia to that of West Virginia was 9 to 2, in which population category was Georgia?
- A B
 - B C
 - C D
 - D E
 - E F
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%
20. The median of the 50 state populations was in which population category?
- A A
 - B B
 - C C
 - D D
 - E E

For the following question, use the grid to enter your answer.

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	1
2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9



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.

Interpretive Information for the Verbal Reasoning and Quantitative Reasoning Measures of the Practice Test

Answer Key and Percentage of Examinees Answering Each Question Correctly*												
Verbal Reasoning						QUANTITATIVE REASONING						
Section 3			Section 4			Section 5			Section +6			
Question Number	Correct Answer	P+	Question Number	Correct Answer	P+	Question Number	Correct Answer	P+	Question Number	Correct Answer	P+	
1	E	57	1	A	60	1	C	76	1	C	85	
2	E	49	2	C	75	2	A	78	2	B	74	
3	C	72	3	A, E	60	3	B	72	3	B	63	
4	A, E	43	4	C, D	61	4	C	61	4	D	60	
5	A, D	79	5	B, F	76	5	A	56	5	D	48	
6	C, E	61	6	C, D, G	48	6	D	51	6	C	55	
7	C, F, G	59	7	C, D, G	22	7	B	67	7	B	47	
8	A, E, H	69	8	B, E, I	36	8	B	27	8	B	50	
9	B	58	9	E	42	9	C	31	9	D	30	
10	D	76	10	B	62	10	100	84	10	B	88	
11	B	53	11	B	52	11	E	87	11	14/4	71	
12	C	60	12	D	42	12	D	88	12	C	67	
13	C	80	13	A, B	69	13	D	82	13	A	63	
14	C	36	14	A	83	14	14/5	63	14	C	63	
15	C, F	89	15	D	26	15	B	55	15	D	58	
16	A, F	50	16	A, C	67	16	B	46	16	AD	73	
17	A, B	77	17	C, E	68	17	A	89	17	B	94	
18	A, B	62	18	A, C	82	18	C	54	18	D	78	
19	B, D	33	19	A, D	26	19	C	30	19	A	36	
20	B	90	20	E	65	20	E	28	20	C	47	
21	A	60	21	A	67	21	C	43	21	729	41	
22	C	23	22	AB	43	22	B	59	22	E	61	

Answer Key and Percentage of Examinees Answering Each Question Correctly*											
Verbal Reasoning						QUANTITATIVE REASONING					
Section 3			Section 4			Section 5			Section +6		
Question Number	Correct Answer	P+	Question Number	Correct Answer	P+	Question Number	Correct Answer	P+	Question Number	Correct Answer	P+
23	AC	81	23	A	72	23	D	34	23	C	40
24	A	20	24	E	543	24	A,B,C,D,E,F	26	24	C	38
25	C	19	25	A, C	50	25	B	44	25	C, D, E	24

* The P+ is the percentage of examinees who answered the question correctly at a previous examination.
 Note: There is no partial credit for partially correct answers. You should treat as incorrect any question for which you did not select all the correct answer choices.

SCORE CONVERSION TABLE

Score Conversion Table		
Section 3		
Raw Score	Verbal Reasoning Scaled Score	Quantitative Reasoning Scaled Score
50	170	170
49	170	170
48	170	168
47	169	167
46	167	165
45	166	164
44	165	163
43	164	162
42	163	161
41	162	160
40	162	159
39	161	158
38	160	157
37	159	157
36	158	156
35	158	155
34	157	154
33	156	154
32	156	153
31	155	152
30	154	152
29	154	151
28	153	150
27	152	150

26	151	149
25	151	148
24	150	147
23	149	147
22	149	146
21	148	145
20	147	144
19	147	144
18	146	143
17	145	142
16	144	141
15	144	141
14	143	140
13	142	139
12	141	138
11	140	137
10	139	136
9	138	135
8	136	134
7	135	133
6	134	132
5	132	130
4	130	130
3	130	130
2	130	130
1	130	130
0	130	130