

PRACTICE TEST I

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SECTION 2
Time—25 minutes
20 questions

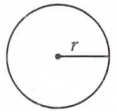
Turn to Section 2 of your answer sheet to answer the questions in this section.

Directions: For this section, solve each problem and decide which is the best of the choices given. Fill in the corresponding circle on the answer sheet. You may use any available space for scratchwork.

Notes

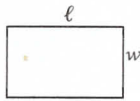
- The use of a calculator is permitted.
- All numbers used are real numbers.
- Figures that accompany problems in this test are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that the figure is not drawn to scale. All figures lie in a plane unless otherwise indicated.
- Unless otherwise specified, the domain of any function f is assumed to be the set of all real numbers x for which $f(x)$ is a real number.

Reference Information

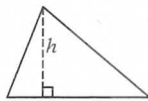


$$A = \pi r^2$$

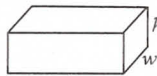
$$C = 2\pi r$$



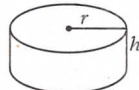
$$A = \ell w$$



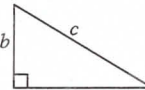
$$A = \frac{1}{2}bh$$



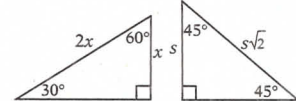
$$V = \ell wh$$



$$V = \pi r^2 h$$



$$c^2 = a^2 + b^2$$



Special right triangles

The number of degrees of arc in a circle is 360.

The sum of the measures in degrees of the angles of a triangle is 180.

1. If $x = 3$ and $5x = 3x + y$, then $y =$

- (A) 1.5
 (B) 2
 (C) 3
 (D) 4
 (E) 6

2. A store sells a package of 6 batteries for \$4 and a package of 24 of the same batteries for \$12. If you need to buy 48 of these batteries, how much money will you save by buying them in packages of 24 rather than packages of 6?

- (A) \$4
 (B) \$8
 (C) \$12
 (D) \$16
 (E) \$20

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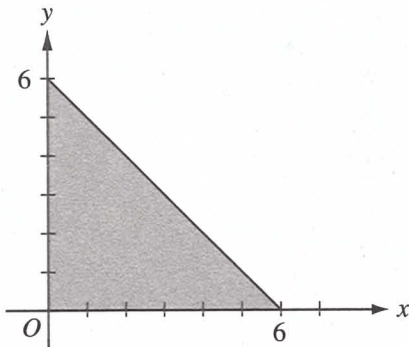
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3. Which of the following points does NOT lie in the shaded region above?

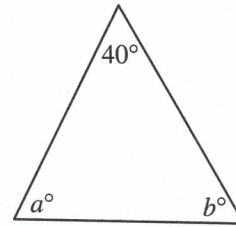
(A) (1, 1)
 (B) (1, 4)
 (C) (2, 3)
 (D) (4, 1)
 (E) (5, 5)

4. If $\frac{1}{3}$ of $2x$ is 5, what is $\frac{2}{3}$ of $4x$?

(A) 5
 (B) 10
 (C) 15
 (D) 20
 (E) 25

5. If n is a positive integer that is divisible by 12 and 16, then n must also be divisible by

(A) 28
 (B) 32
 (C) 48
 (D) 96
 (E) 192



Note: Figure not drawn to scale.

6. In the figure above, if $a - b = 10$, then $a =$

(A) 60
 (B) 65
 (C) 70
 (D) 75
 (E) 80

7. If n is an integer, which of the following must be an even integer?

(A) $\frac{n}{2}$
 (B) $n + 2$
 (C) $2n + 1$
 (D) n^2
 (E) $n^2 + n$

8. Mike sold a total of 48 sodas at a snack stand. The stand sells only cola and root beer. If he sold twice as many colas as root beers, how many root beers did he sell?

(A) 32
 (B) 24
 (C) 18
 (D) 16
 (E) 8

9. If m and n are both squares of integers, which of the following is NOT necessarily the square of an integer?

(A) $9m$
 (B) mn
 (C) m^2
 (D) $9mn$
 (E) $9m - 9n$

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10. If $a + b = 9$, $a - c = 14$, and $a = 10$, then $c - b =$

- (A) -5
- (B) -3
- (C) 3
- (D) 5
- (E) 23

11. If the average (arithmetic mean) of a , b , 4, and 10 is 8, what is the value of $a + b$?

- (A) 4
- (B) 6
- (C) 9
- (D) 15
- (E) 18

0	1	2	3	4	5
1	2	4			
2					
3			x		
4					
5					

12. With the exception of the shaded squares, every square in the figure above contains the sum of the number in the square directly above it and the number in the square directly to its left. For example, the number 4 in the unshaded square above is the sum of the 2 in the square above it and the 2 in the square directly to its left. What is the value of x ?

- (A) 6
- (B) 7
- (C) 8
- (D) 15
- (E) 30

13. If a , b , and c are positive even integers such that $a < b < c$ and $a + b + c = 60$, then the greatest possible value of c is

- (A) 36
- (B) 40
- (C) 42
- (D) 54
- (E) 57

14. The population of Bampton increased by 10% from 1980 to 1990 and decreased by 10% from 1990 to 2000. What is the net percent change in the population of Bampton from 1980 to 2000?

- (A) -9%
- (B) -1%
- (C) +0%
- (D) +1%
- (E) +9%

x	$f(x)$
-2	-29
-1	-21
0	-13
1	-5
2	3
3	11
4	19

15. Several values of the function f are shown above. The function g is defined by $g(x) = 2f(x) - 1$. What is the value of $g(3)$?

- (A) -21
- (B) -13
- (C) 3
- (D) 11
- (E) 21

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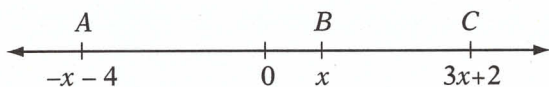
16. If $x > 0$ and $x = 5y$, then $\sqrt{x^2 - 2xy + y^2} =$

- (A) $2y$
 (B) $y\sqrt{6}$
 (C) $4y$
 (D) $16y$
 (E) $24y$

17. If $x > x^2$, which of the following must be true?

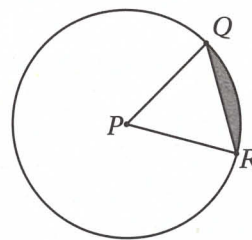
- I. $x < 1$
 II. $x > 0$
 III. $x^2 > 1$

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



18. Which of the following represents the distance from the midpoint of \overline{AB} to the midpoint of \overline{BC} on the number line above?

- (A) $\frac{3x+2}{2}$
 (B) $2x-1$
 (C) $2x+3$
 (D) $3x+1$
 (E) $4x$



19. P is the center of the circle above and $PQ = QR$. If $\triangle PQR$ has an area of $9\sqrt{3}$, what is the area of the shaded region?

- (A) $36\pi - 9\sqrt{3}$
 (B) $24\pi - 9\sqrt{3}$
 (C) $18\pi - 9\sqrt{3}$
 (D) $9\pi - 9\sqrt{3}$
 (E) $6\pi - 9\sqrt{3}$

20. In a class of 160 seniors, the ratio of boys to girls is 3 to 5. In the junior class, the ratio of boys to girls is 3 to 2. When the two classes are combined, the ratio of boys to girls is 1 to 1. How many students are in the junior class?

- (A) 400
 (B) 360
 (C) 200
 (D) 180
 (E) 160



If you finish before time is called, you may check your work on this section only. Do not turn to any other section of the test.

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SECTION 5
Time—25 minutes
18 questions

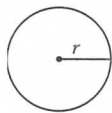
Turn to Section 5 of your answer sheet to answer the questions in this section.

Directions: This section contains two types of questions. You have 25 minutes to complete both types. For questions 1–8, solve each problem and decide which is the best of the choices given. Fill in the corresponding circle on the answer sheet. You may use any available space for scratchwork.

Notes

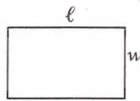
1. The use of a calculator is permitted.
2. All numbers used are real numbers.
3. Figures that accompany problems in this test are intended to provide information useful in solving the problems. They are drawn as accurately as possible EXCEPT when it is stated in a specific problem that the figure is not drawn to scale. All figures lie in a plane unless otherwise indicated.
4. Unless otherwise specified, the domain of any function f is assumed to be the set of all real numbers x for which $f(x)$ is a real number.

Reference Information

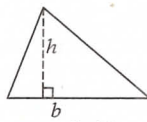


$$A = \pi r^2$$

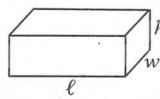
$$C = 2\pi r$$



$$A = \ell w$$



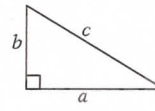
$$A = \frac{1}{2}bh$$



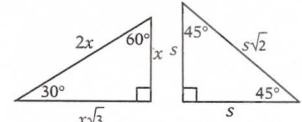
$$V = \ell wh$$



$$V = \pi r^2 h$$



$$c^2 = a^2 + b^2$$



Special right triangles

The number of degrees of arc in a circle is 360.

The sum of the measures in degrees of the angles of a triangle is 180.

1. If $2x = 10$ and $3y = 12$, then $4x + 6y =$

(A) 10
 (B) 12
 (C) 22
 (D) 32
 (E) 44

2. The average (arithmetic mean) of three numbers is 5. If one of the numbers is 4, what is the sum of the other two numbers?

(A) 8
 (B) 9
 (C) 10
 (D) 11
 (E) 12

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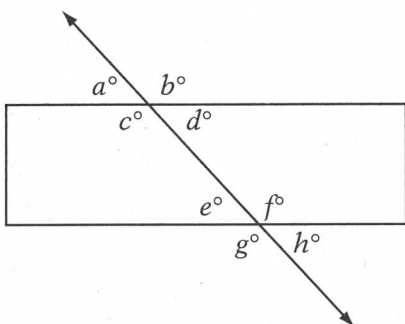
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3. The figure above shows a rectangle intersected by a line. If $b = 2a$, then $d + e + g + h =$

(A) 120
 (B) 240
 (C) 300
 (D) 320
 (E) 360

4. For all real numbers x where $x \geq 1$, let

$$f(x) = \sqrt{\sqrt{x} - 1}. \text{ What is the value of } f(100)?$$

(A) 3
 (B) 9
 (C) 10
 (D) 27
 (E) 100

5. If $3^{k+m} = 243$ and $2^m = 8$, then what is the value of 2^k ?

(A) 2
 (B) 4
 (C) 6
 (D) 8
 (E) 10

6. If b varies inversely as the square of c , and if $b = 8$ when $c = 3$, then what could be the value of c when $b = 2$?

(A) 2
 (B) 5
 (C) 6
 (D) 25
 (E) 36

7. In a certain soccer league, each of the five teams plays every other team in the league exactly three times each season. How many games are played in total in one season?

(A) 15
 (B) 24
 (C) 30
 (D) 60
 (E) 120

8. Pump A, working alone, can fill a tank in 3 hours, and pump B can fill the same tank in 2 hours. If the tank is empty to start and pump A is switched on for one hour, after which pump B is also switched on and the two work together, how many *minutes* will pump B have been working by the time the tank is filled?

(A) 48
 (B) 50
 (C) 54
 (D) 60
 (E) 64

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Directions: For student-produced response questions 9–18, use the grids at the bottom of the answer sheet page on which you have answered questions 1–8.

Each of the remaining ten questions requires you to solve the problem and enter your answer by marking the circles in the special grid, as shown in the examples below. You may use any available space for scratchwork.

Answer: $\frac{7}{12}$

Write answer in boxes. →

	7	/	1	2
	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
	0	0	0	0
1	1	<input checked="" type="radio"/>	1	1
2	2	2	<input checked="" type="radio"/>	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5
6	6	6	6	6
	7	7	7	7
8	8	8	8	8
9	9	9	9	9

← Fraction line

Grid in result. →

Answer: 2.5

	2	.	5
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	0	0	0
1	1	1	1
2	<input checked="" type="radio"/>	2	2
3	3	3	3
4	4	4	4
5	5	5	<input checked="" type="radio"/>
6	6	6	6
7	7	7	7
8	8	8	8
9	9	9	9

← Decimal point

Answer: 201
Either position is correct.

	2	0	1	
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	0	<input checked="" type="radio"/>	0	0
1	1	1	<input checked="" type="radio"/>	1
2	<input checked="" type="radio"/>	2	2	2
3	3	3	3	3
4	4	4	4	4
5	5	5	5	5

	2	0	1
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	0	<input checked="" type="radio"/>	0
1	1	1	<input checked="" type="radio"/>
2	<input checked="" type="radio"/>	2	2
3	3	3	3
4	4	4	4
5	5	5	5

Note: You may start your answers in any column, space permitting. Columns not needed should be left blank.

- Mark no more than one circle in any column.
- Because the answer sheet will be machine-scored, **you will receive credit only if the circles are filled in correctly.**
- Although not required, it is suggested that you write your answer in the boxes at the top of the columns to help you fill in the circles accurately.
- Some problems may have more than one correct answer. In such cases, grid only one answer.
- No question has a negative answer.
- **Mixed numbers** such as $3\frac{1}{2}$ must be gridded as

3.5 or 7/2. (If

3	1	/	2
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

 is gridded, it will be

interpreted as $\frac{31}{2}$ not $3\frac{1}{2}$.)

- **Decimal Answers:** If you obtain a decimal answer with more digits than the grid can accommodate, it may be either rounded or truncated, but it must fill the entire grid. For example, if you obtain an answer such as 0.6666..., you should record your result as .666 or .667. **A less accurate value such as .66 or .67 will be scored as incorrect.**

Acceptable ways to grid $\frac{2}{3}$ are:

	2	/	3
	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
	0	0	0
1	1	1	1
2	<input checked="" type="radio"/>	2	2
3	3	3	<input checked="" type="radio"/>
4	4	4	4
5	5	5	5
6	6	6	6

.	6	6	6
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>

.	6	6	7
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	0	0	0
1	1	1	1
2	2	2	2
3	3	3	3
4	4	4	4
5	5	5	5
6	<input checked="" type="radio"/>	<input checked="" type="radio"/>	<input checked="" type="radio"/>

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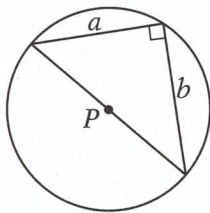
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9. If four times a certain number is decreased by 5, the result is 25. What is the number?

10. For every integer m greater than 1, let « m » be defined as the sum of the integers from 1 to m , inclusive. For instance, «4» = $1 + 2 + 3 + 4 = 10$. What is the value of «7» - «5»?



11. If the circumference of the circle above is 10π , then what is the value of $a^2 + b^2$?

A, B, C, D

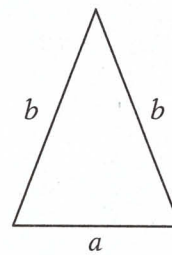
12. How many different three-letter arrangements of the letters above are possible if no letter may be repeated? (An arrangement like ABC is distinct from an arrangement like BCA.)

13. If $96,878 \times x^2 = 10,200$, then $\frac{10,200}{5x^2 \times 96,878} =$

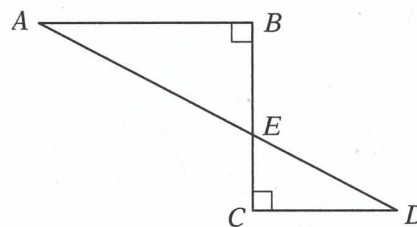
14. Every term in a certain sequence is one less than three times the previous term. If the fourth term of this sequence is 95, what is the first term of the sequence?

15. If $4 + \sqrt{b} = 7.2$, what is the value of $4 - \sqrt{b}$?

16. Admission to a museum is \$10 for each adult and \$5 for each child. If a group of 30 people pays a total of \$175 in admission, how many adults are in the group?



17. The perimeter of the isosceles triangle above is 24. If the ratio of a to b is 2 to 3, what is the value of b ?



Note: Figure not drawn to scale.

18. In the figure above, $AB = 6$, $BC = 6$, and $CD = 2$. What is AD ?



If you finish before time is called, you may check your work on this section only. Do not turn to any other section of the test.