SECTION 6
Time — 25 minutes
18 Questions

Turn to Section 6 (page 6) 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.
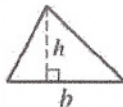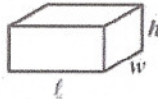
Reference Information
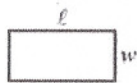
$A = \pi r^2$
$C = 2\pi r$
$A = \ell w$
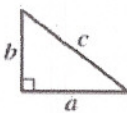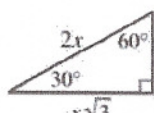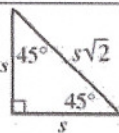$A = \frac{1}{2}bh$
$V = \ell wh$
$V = \pi r^2 h$
$c^2 = a^2 + b^2$
Special Right Triangles

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.

$$4, 11, 18, \ldots$$

1. In the sequence above, the first term is 4 and each term after the first is 7 more than the previous term. What is the 12th term of the sequence?

   (A) 77
   (B) 81
   (C) 84
   (D) 86
   (E) 92

   9 more terms
   ·7
   63 + 18 = 81

2. If $(x - 2)^2 = 49$, then x could be

   (A) −9
   (B) −7
   (C) 2
   (D) 5
   (E) 9

   x − 2 = 7
   or −7

3. The average (arithmetic mean) of t and y is 15, and the average of w and x is 15. What is the average of t, w, x, and y ?

   (A) 7.5
   (B) 15
   (C) 22.5
   (D) 30
   (E) 60

   avg = 15
   sum = 30
   + 30
   60 ÷ 4 = 15

GO ON TO THE NEXT PAGE

All of Kay's brothers can swim.

4. If the statement above is true, which of the following must also be true?

(A) If Fred cannot swim, then he is not Kay's brother.
(B) If Dave can swim, then he is not Kay's brother.
(C) If Walt can swim, then he is Kay's brother.
(D) If Pete is Kay's brother, then he cannot swim.
(E) If Mark is not Kay's brother, then he cannot swim.
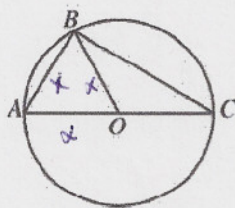
5. In the figure above, triangle ABC is inscribed in the circle with center O and diameter $\overline{AC}$. If $AB = AO$, what is the degree measure of $\angle ABO$?

(A) 15°
(B) 30°
(C) 45°
(D) 60°
(E) 90°

Equilateral △
because BO = AO

6. Each of the following is equivalent to $\dfrac{a}{b}(bc + k)$ EXCEPT

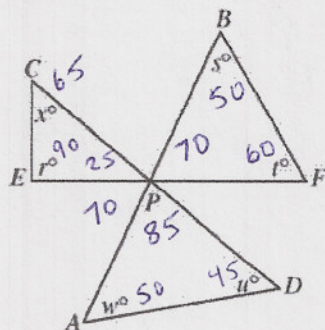*= ac + $\dfrac{ak}{b}$*

(A) $a\left(\dfrac{c + k}{b}\right)$ *= $\dfrac{ac + ak}{b}$ = $\dfrac{ac}{b} + \dfrac{ak}{b}$*

(B) $a\left(c + \dfrac{k}{b}\right)$

(C) $\dfrac{a}{b}(k + bc)$
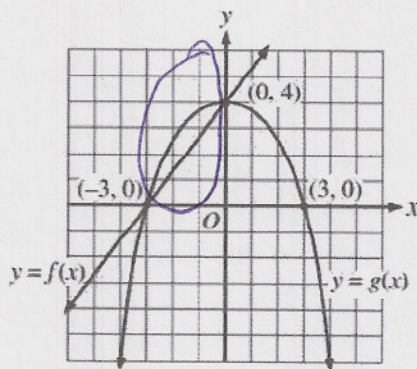
(D) $ac + \dfrac{ak}{b}$

(E) $\dfrac{abc + ak}{b}$

Note: Figure not drawn to scale.

7. In the figure above, $\overline{AB}, \overline{CD},$ and $\overline{EF}$ intersect at P. If $r = 90$, $s = 50$, $t = 60$, $u = 45$, and $w = 50$, what is the value of x?

(A) 45
(B) 50
(C) 65
(D) 75
(E) It cannot be determined from the information given.

Fill in the givens & calculate the rest.

8. Based on the portions of the graphs of the functions f and g shown above, what are all values of x between -6 and 6 for which $g(x) > f(x)$?

(A) $-6 < x < -3$ only
(B) $-3 < x < 0$ only
(C) $0 < x < 3$ only
(D) $3 < x < 6$ only
(E) $-6 < x < -3$ and $0 < x < 3$

← where y is greater

GO ON TO THE NEXT PAGE

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 10 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 |
← Fraction line

Grid in result. →

Answer: 2.5

| 2 | . | 5 |
← Decimal point

Answer: 201
Either position is correct.

| 2 | 0 | 1 | | | 2 | 0 | 1 | |

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 | 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 | | . | 6 | 6 | 6 | | . | 6 | 6 | 7 |

9. When her son's class held its magazine drive, Dr. Nelson bought 7 one-year magazine subscriptions for the waiting room in her office. She bought 4 subscriptions that have 12 issues per year, 2 subscriptions that have 4 issues per year, and 1 subscription that has 52 issues per year. Altogether, how many magazines will her office receive from these subscriptions?

$4 \cdot 12 = 48$

$2 \cdot 4 = 8$

$1 \cdot 52 = 52$
_____
108

10. Three more than twice a number is equal to 4. What is the number?

$2x + 3 = 4$

$2x = 1$

$x = \frac{1}{2}$

GO ON TO THE NEXT PAGE →

SALES OF BOOK *B*

	Total Number of Copies Sold
End of 1st week	3200
End of 2nd week	5500
End of 3rd week	6800
End of 4th week	7400
End of 5th week	7700

11. The table above shows the <u>total</u> number of copies of Book *B* that were sold by the end of each of the first 5 weeks of its publication. How many copies of the book were sold during the 3rd week of its publication?

$6800 - 5500 = 1300$

12. If $\frac{j}{k} = 32$ and $k = \frac{3}{2}$, what is the value of $\frac{1}{2}j$?

$j \div k = 32 \mid j \div \frac{3}{2} = 32 \cdot \frac{3}{2} = J = \frac{\overset{24}{96}}{2} = 48$

$$x + y + 3z = 600$$
$$x + y + z = 400$$
$$2z = 200 \quad z = 100$$

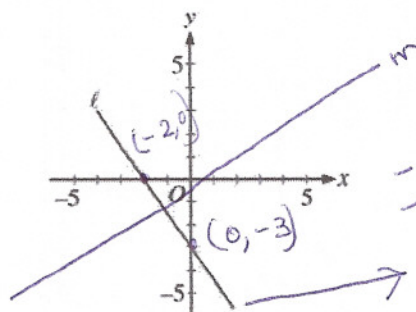**13.** In the system of equations above, what is the value of $x + y$?

300

14. There are 25 trays on a table in the cafeteria. Each tray contains a cup only, a plate only, or both a cup and a plate. If 15 of the trays contain cups and 21 of the trays contain plates, how many contain both a cup and a plate?

15 cups
+ 21 plates
36 total items
− 25 trays
11 trays that must have cup & plate

15. In the figure above, line ℓ intersects the *x*-axis at $x = -2$ and the *y*-axis at $y = -3$. If line *m* (not shown) passes through the origin and is perpendicular to line ℓ, what is the slope of line *m* ?

① Calculate slope of ℓ

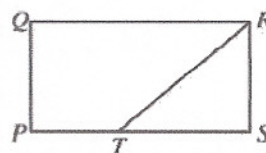$\frac{-3 - 0}{0 - -2} = \frac{-3}{2}$

negative reciprocal

$2/3$

16. If $6 < |x - 3| < 7$ and $x < 0$, what is one possible value of $|x|$?

$|x - 3| = 6.5$
$x = -3.5 \quad |x| = 3.5$

17. What is the product of the smallest prime number that is greater than 50 and the greatest prime number that is less than 50 ?

$53 \cdot 47 = 2,491$

18. In the figure above, *PQRS* is a rectangle. The area of $\triangle RST$ is 7 and $PT = \frac{2}{5}PS$. What is the area of *PQRS* ?

$TS = \frac{3}{5}PS$

$\frac{1}{2}\left(\frac{3}{5}PS \cdot RS\right) = 7$

$\frac{3}{5}PS \cdot RS = 14$

$PS \cdot RS = \frac{70}{3} = 23.3$

area of PQRS

STOP

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