

SECTION 3

Time — 25 minutes

20 Questions

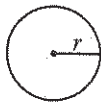
Turn to Section 3 (page 4) of your answer sheet to answer the questions in this section.

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

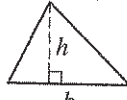


$$A = \pi r^2$$

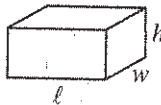
$$C = 2\pi r$$



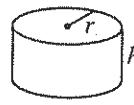
$$A = \ell w$$



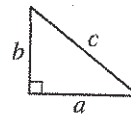
$$A = \frac{1}{2}bh$$



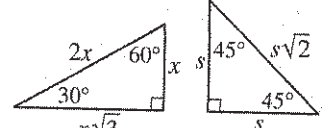
$$V = \ell wh$$



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



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



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 $3b + 1 < 10$, which of the following CANNOT be the value of b ?

- (A) -1
(B) 0
(C) 1
(D) 2
(E) 3

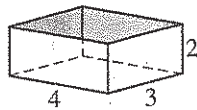
3. How much greater than $r - 2$ is $r + 5$?

- (A) 2
(B) 3
(C) 5
(D) 6
(E) 7

2. If $2^{4x} = 16$, then $x =$

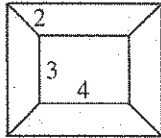
- (A) 1
(B) 2
(C) 4
(D) 8
(E) 12

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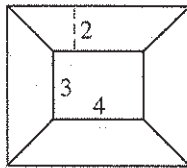


4. If the rectangular box with no lid shown above is cut along the vertical edges and flattened, which of the following figures best represents the result?

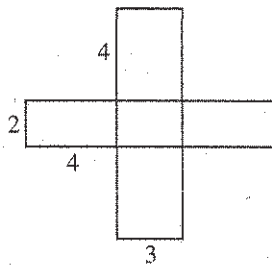
(A)



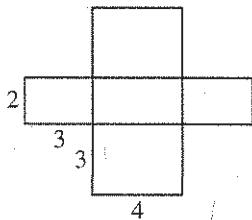
(B)



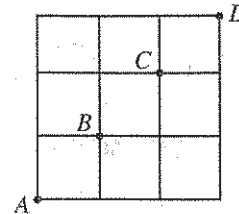
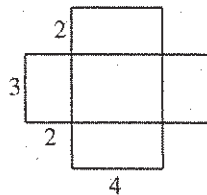
(C)



(D)



(E)



5. In the figure above, a path from point A to point D is determined by moving upward or to the right along the grid lines. How many different paths can be drawn from A to D that do not include either B or C ?

- (A) Two
(B) Four
(C) Six
(D) Eight
(E) Sixteen

6. If $\frac{3}{7}$ of n is 42, what is $\frac{5}{7}$ of n ?

- (A) 70
(B) 45
(C) 30
(D) 18
(E) 10

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A	D
B	E
C	F

7. The figure above shows the top view of an open square box that is divided into 6 compartments with walls of equal height. Each of the rectangles D , E , and F has twice the area of each of the equal squares A , B , and C . When a marble is dropped into the box at random, it falls into one of the compartments. What is the probability that it will fall into compartment F ?

- (A) $\frac{1}{12}$
 (B) $\frac{1}{8}$
 (C) $\frac{1}{6}$
 (D) $\frac{2}{11}$
 (E) $\frac{2}{9}$

8. If a and b are odd integers, which of the following must also be an odd integer?

- I. $(a + 1)b$
 II. $(a + 1) + b$
 III. $(a + 1) - b$

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

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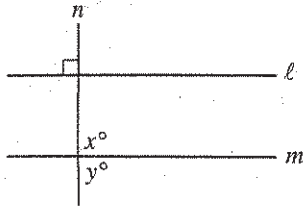
9. The decimal number above consists of only 1's and 0's to the right of the decimal point. The first 1 is followed by one 0, the second 1 is followed by two 0's, the third 1 is followed by three 0's, and so on. What is the total number of 0's between the 98th and the 101st 1 in this decimal number?

- (A) 288
 (B) 291
 (C) 294
 (D) 297
 (E) 300

10. If $f(x) = \frac{3 - 2x^2}{x}$ for all nonzero x , then $f(2) =$

- (A) $\frac{11}{2}$
 (B) $\frac{7}{2}$
 (C) $-\frac{1}{2}$
 (D) $-\frac{5}{2}$
 (E) -7

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Note: Figure not drawn to scale.

11. In the figure above, $\ell \perp n$ and $x > 90$. Which of the following must be true?

(A) $y < 90$
 (B) $y > 90$
 (C) $y = 90$
 (D) $n \perp m$
 (E) $\ell \parallel m$

12. In the xy -plane, the line with equation $y = 5x - 10$ crosses the x -axis at the point with coordinates (a, b) .

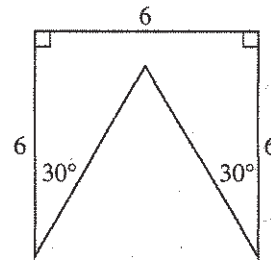
What is the value of a ?

(A) -10
 (B) -2
 (C) 0
 (D) 2
 (E) 5

City	Noon Temperature (degrees Fahrenheit)
A	50°
B	33°
C	27°
D	t°
E	68°
F	44°
G	40°

13. The table above shows the noon temperatures for seven cities designated A through G. If the median noon temperature of these cities is 40°F , then the noon temperature for City D could be any of the following EXCEPT

(A) 29°F
 (B) 35°F
 (C) 39°F
 (D) 40°F
 (E) 42°F



14. What is the perimeter of the figure above?

(A) 24
 (B) 25
 (C) 28
 (D) 30
 (E) 36

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15. If m is the greatest prime factor of 38 and n is the greatest prime factor of 100, what is the value of $m + n$?

(A) 7
(B) 12
(C) 24
(D) 29
(E) 44

16. Line ℓ has a positive slope and passes through the point $(0, 0)$. If line k is perpendicular to line ℓ , which of the following must be true?

(A) Line k passes through the point $(0, 0)$.
(B) Line k has a positive slope.
(C) Line k has a negative slope.
(D) Line k has a positive x -intercept.
(E) Line k has a negative y -intercept.

17. Let the operation $\hat{\cup}$ be defined by $a \hat{\cup} b = \frac{a+b}{a-b}$

for all numbers a and b , where $a \neq b$.

If $1 \hat{\cup} 2 = 2 \hat{\cup} x$, what is the value of x ?

(A) 4
(B) 3
(C) 2
(D) 1
(E) 0

18. During a sale, a customer can buy one shirt for x dollars. Each additional shirt the customer buys costs z dollars less than the first shirt. For example, the cost of the second shirt is $x - z$ dollars. Which of the following represents the customer's cost, in dollars, for n shirts bought during this sale?

(A) $x + (n - 1)(x - z)$

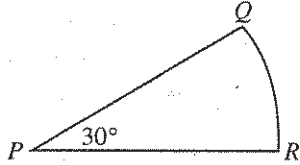
(B) $x + n(x - z)$

(C) $n(x - z)$

(D) $\frac{x + (x - z)}{n}$

(E) $(x - z) + \frac{(x - z)}{n}$

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19. In the figure above, QR is the arc of a circle with center P . If the length of arc QR is 6π , what is the area of sector PQR ?

- (A) 108π
 (B) 72π
 (C) 54π
 (D) 36π
 (E) 9π

20. There are 75 more women than men enrolled in Linden College. If there are n men enrolled, then, in terms of n , what percent of those enrolled are men?

- (A) $\frac{n}{n+75}\%$
 (B) $\frac{n}{2n+75}\%$
 (C) $\frac{n}{100(2n+75)}\%$
 (D) $\frac{100n}{n+75}\%$
 (E) $\frac{100n}{2n+75}\%$

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.