

## SECTION 3

Time – 25 minutes

20 Questions

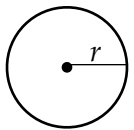
Turn to Section 3 of your answer sheet to answer the questions in this section.

**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 scratch work.

Notes

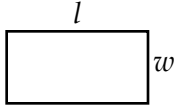
- The use of calculator is permitted.
- All numbers used are real numbers.
- Figures that accompany problems in this test are intended to provide information useful in solving the problems. They are drawn as accurately as possibly EXCEPT when it is stated in a specific problem that the figure is not 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

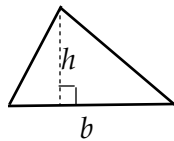


$$A = \pi \cdot r^2$$

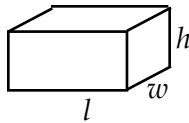
$$C = 2 \cdot \pi \cdot r$$



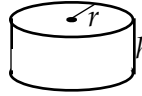
$$A = l \cdot w$$



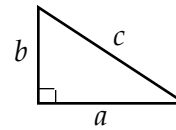
$$A = \frac{1}{2} b \cdot h$$



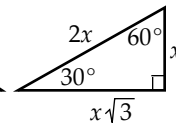
$$V = l \cdot w \cdot h$$



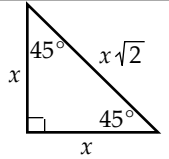
$$V = \pi \cdot r^2 \cdot h$$



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



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  $6x + 18 = 24y$ , then  $x + 3 =$

- (A)  $y + 6$   
 (B)  $y + 12$   
 (C)  $4y$   
 (D)  $4y + 6$   
 (E)  $2a + 6$

2. Let  $X$ ,  $Y$ , and  $Z$  lie on a line in that order. If  $XZ = 70$  and  $XY$  is 50 less than  $XZ$ , what is the value of  $YZ$ ?

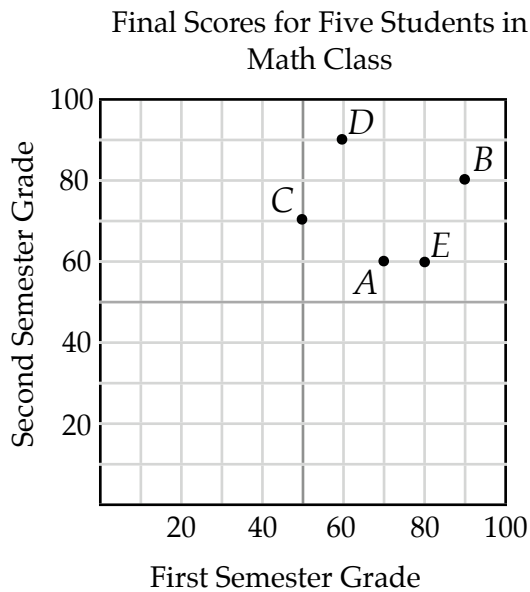
- (A) 20  
 (B) 30  
 (C) 40  
 (D) 50  
 (E) 60

3. Jack went to the store to buy hamburger buns for a birthday party. At the store, there were 6 packages of hamburger buns. Two packages had 8 hamburger buns and the other packages had 10 hamburger buns. If Jack purchased all 6 packages, how many hamburger buns did he purchase?

- (A) 42  
 (B) 48  
 (C) 56  
 (D) 64  
 (E) 68

GO ON THE THE NEXT PAGE 

Questions 4-5 refer to the following graph.

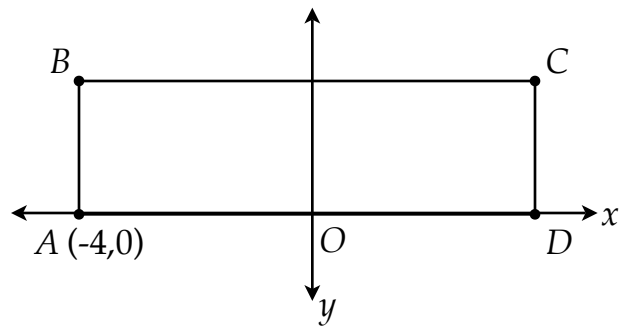


4. What was the class average (arithmetic mean) of the five students for the first semester?

(A) 60  
(B) 70  
(C) 75  
(D) 80  
(E) 85

5. Which student improved the most from first semester to second semester?

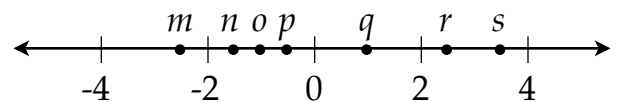
(A) A  
(B) B  
(C) C  
(D) D  
(E) E



NOTE: Figure not drawn to scale

6.  $ABCD$  is a rectangle in the  $xy$ -coordinate plane. In the figure above,  $AO = OD$  and the coordinate of  $B$  is  $(-4,k)$ . If the area of rectangle  $ABCD$  is 32, What is the value of  $k$ ?

(A) -4  
(B) 2  
(C) 0  
(D) 4  
(E) 8



7. Points  $m$ ,  $n$ ,  $o$ ,  $p$ ,  $q$ ,  $r$ , and  $s$  are coordinates on the number line above. Which of the following is closest in value to  $-|n - p|$ ?

(A)  $m$   
(B)  $o$   
(C)  $p$   
(D)  $q$   
(E)  $r$

$x$	-2	-1	0	1	2
$f(x)$	0	3	6	9	12

8. The table gives values of the linear function  $f$  for selected values of  $x$ . Which of the following defines  $f$ ?

- (A)  $f(x) = x - 2$   
 (B)  $f(x) = 3x$   
 (C)  $f(x) = 3x + 6$   
 (D)  $f(x) = x + 6$   
 (E)  $f(x) = 3x^2 + 6$

- 
9. If  $x = \frac{-1}{2}$ , what is the value of  $\frac{1}{x+1} - \frac{1}{x}$ ?

- (A) -4  
 (B) -2  
 (C) 0  
 (D) 2  
 (E) 4

4 1 3 2

10. The sequence may be changed in either of the two ways. Either two adjacent numbers may be interchanged or the entire sequence may be reversed. What is the least number of such changes needed to list the numbers from least to greatest moving from left to right?

- (A) 3  
 (B) 4  
 (C) 5  
 (D) 6  
 (E) 7

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11. If  $0 < x < 1$ , which of the following gives the correct ordering of  $\sqrt{x}$ ,  $x$ , and  $x^2$ ?

- (A)  $\sqrt{x} < x < x^2$   
 (B)  $\sqrt{x} < x^2 < x$   
 (C)  $x < \sqrt{x} < x^2$   
 (D)  $x < x^2 < \sqrt{x}$   
 (E)  $x^2 < x < \sqrt{x}$

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12. If Kim was  $n$  years old 10 years ago. How old was Kim  $m$  years ago?

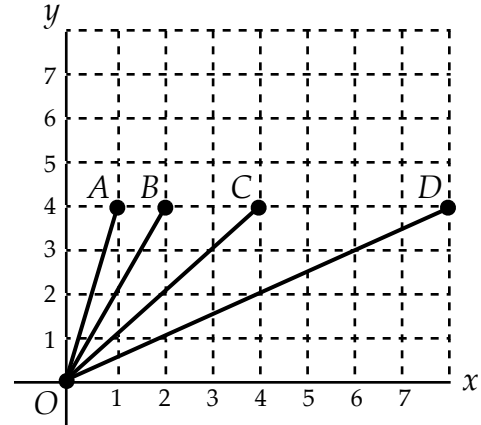
- (A)  $m - 10$   
 (B)  $m - n - 10$   
 (C)  $10 + n - m$   
 (D)  $n + m + 10$   
 (E)  $10 - n - m$

13. Eastern standard time (EST) and Pacific standard time (PST) are 3 hours apart. For example, when it is 11:00 AM (EST) in Atlanta, it is 8:00 AM (PST) in Los Angeles. If a plane leaves Atlanta at 2:00 PM EST and arrives in Los Angeles at 3:00 PM PST, how long is the plane ride from Atlanta to Los Angeles?

- (A) 1 hour  
 (B) 2 hours  
 (C) 3 hours  
 (D) 4 hours  
 (E) 5 hours

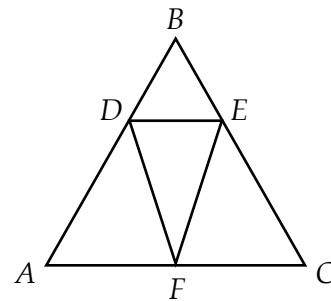
14. How many cubes with edges of length 6 feet, can fit into a rectangular box that has dimensions 12 feet by 18 feet by 36 feet?

- (A) 24  
 (B) 32  
 (C) 36  
 (D) 42  
 (E) 48



15. In the figure above, what is the average (arithmetic mean) of the slopes of  $\overline{OA}$ ,  $\overline{OB}$ ,  $\overline{OC}$ , and  $\overline{OD}$ ?

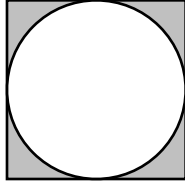
- (A)  $\frac{1}{8}$   
 (B) 1  
 (C)  $\frac{15}{8}$   
 (D)  $\frac{15}{4}$   
 (E)  $\frac{15}{2}$



Note: Figure not drawn to scale

16. If the figure above,  $AB = BC = AC$ ,  $BD = DE = BE$ , and  $DF = EF$ . If the measure of  $\angle DFE$  is  $40^\circ$ , what is the measurement of  $\angle DFA$ ?

- (A)  $50^\circ$   
 (B)  $60^\circ$   
 (C)  $70^\circ$   
 (D)  $75^\circ$   
 (E)  $80^\circ$



17. The above circle is inscribed within a square. The radius of the circle is 1 unit. What is the area of the shaded region?

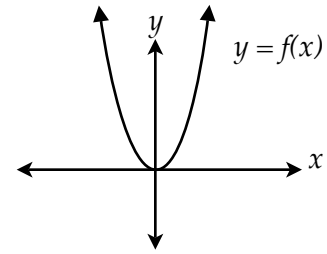
- (A)  $1 - \pi$   
 (B)  $2 - \frac{\pi}{2}$   
 (C)  $2 - \pi$   
 (D)  $4 - \frac{\pi}{2}$   
 (E)  $4 - \pi$

18. If  $\frac{a}{b} = \frac{c}{d}$ , then all of the following are true EXCEPT...

- (A)  $\frac{b}{a} = \frac{d}{c}$   
 (B)  $cb = ad$   
 (C)  $\frac{ad}{cb} = \frac{1}{1}$   
 (D)  $\frac{b}{a} = \frac{d}{c}$   
 (E)  $ac = db$

19. For all numbers  $x$  and  $y$ , let  $x \diamond y = x^2 - y$  and  $x \square y = x^3 - 3y$ . What is the following value of  $(4 \diamond 2) - (2 \square 4)$ ?

- (A) 16  
 (B) 18  
 (C) 22  
 (D) 24  
 (E) 28



20. The graph of  $y = f(x)$  is shown above. Which of the following could be the graph of  $y = f(x + 2) + 4$ ?

