

Section 5: Mathematics

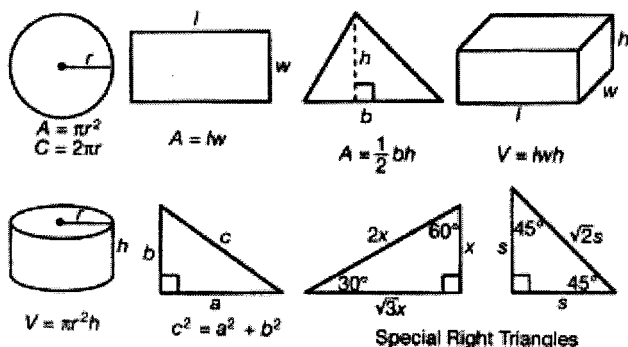
DIRECTIONS: Solve each problem, using any available space on the page for scratch work. Then decide which answer choice is the best and fill in the corresponding oval on the answer sheet.

NOTES:

(1) The use of a calculator is permitted. All numbers used are real numbers.

(2) 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.

REFERENCE INFORMATION:



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

The measure in degrees of a straight angle is 180.

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

1. If $m^2 = 625$, and $m > 0$, what is the value of $3m^{-\frac{1}{2}}$?

(A) 75

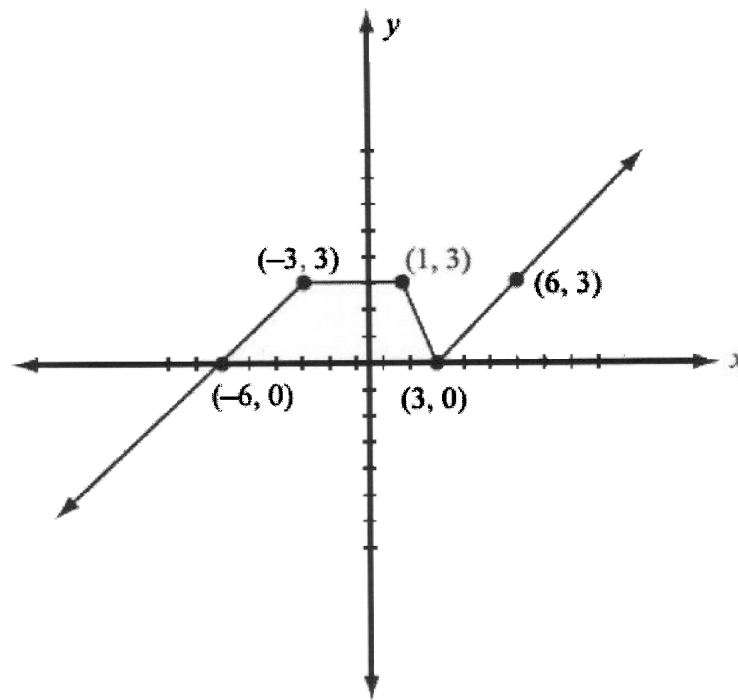
(B) 37.5

(C) 15

(D) 0.6

(E) 0.2

2.



In the graph shown above, for what complete list of values of x are the y values less than 3?

(A) $1 < x < 6$

(B) $x < -3$; $1 < x < 6$

(C) $x < 1$

(D) $x < -3$

(E) $x < -3$; $x > 1$

3. Given $\{13, 7, 9, 19, 9, 27\}$, what is the value of the median of this set?

(A) 18

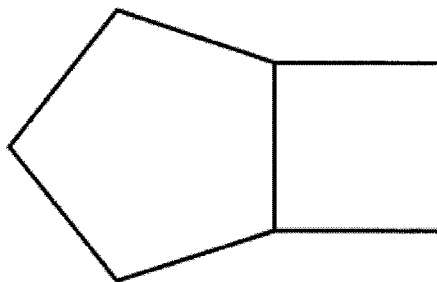
(B) 14

(C) 13

(D) 11

(E) 9

4.



In the figure above, a regular pentagon and a square share a common side. If the perimeter of the pentagon is 12.5, what is the area of the square?

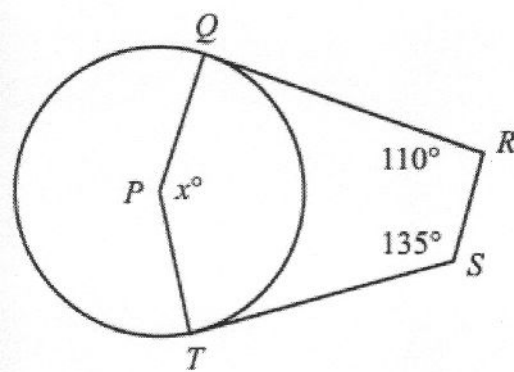
- (A) 6.25
- (B) 10
- (C) 18
- (D) 25
- (E) 50

5.

	Men	Women	Children
Small	\$15	\$12	\$8
Medium	\$20	\$16	\$10
Large	\$25	\$18	\$14

The table above shows the price per shirt for men, women, and children. The three different sizes are also shown. A family has \$200 to spend and must buy 3 children's shirts in a medium size, 4 women's shirts in a small size, and some men's shirts. How much money will be left if the family buys the maximum number of men's shirts they can afford?

- (A) \$1.00
- (B) \$1.50
- (C) \$2.00
- (D) \$5.00
- (E) \$8.00



In the figure above, P is the center of the circle. QR and ST are tangents to the circle. What is the value of x ?

(A) 115

(B) 120

(C) 125

(D) 140

(E) 145

7. If $-\frac{4x+5}{3} > -6$, which of the following describes all possible values of x ?

(A) $x < \frac{23}{4}$

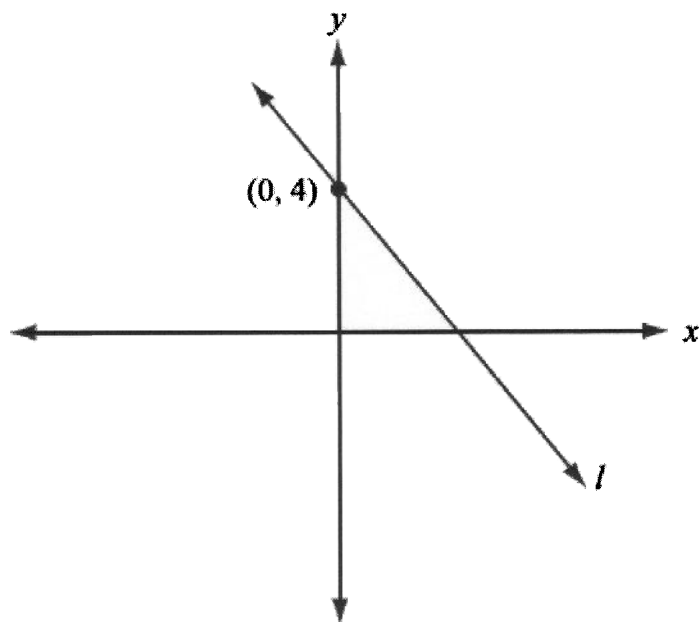
(B) $x > -\frac{23}{4}$

(C) $x < -\frac{13}{4}$

(D) $-\frac{23}{4} < x < \frac{13}{4}$

(E) $-\frac{23}{4} < x < -\frac{13}{4}$

8.

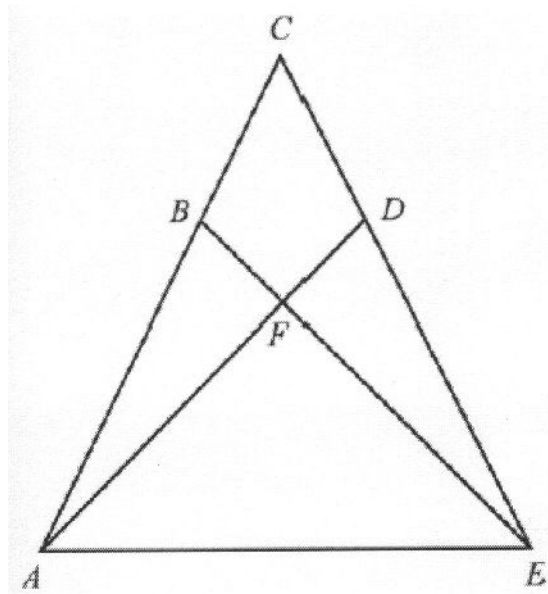


Note: Figure not drawn to scale.

In the figure above, if the slope of line l is $-\frac{8}{7}$, what is the x -intercept of line l ?

- (A) 3
- (B) $\frac{13}{4}$
- (C) $\frac{7}{2}$
- (D) $\frac{15}{4}$
- (E) 4

9.



In the figure above, $AC = CE$ and $AB = DE$. Which of the following statements must be true?

I. $AB = FE$

II. $\angle ABE \cong \angle EDA$

III. $\triangle ACD \cong \triangle ABE$

(A) I only

(B) II only

(C) II and III only

(D) I, II, and III

(E) None of the above

10. Lines ℓ_1 and ℓ_2 are perpendicular and intersect at $(1, 4)$. If ℓ_1 contains the point $(3, 9)$, which of the following lies on ℓ_2 ?

(A) $(3, -1)$

(B) $(-9, 8)$

(C) $(-1, -1)$

(D) $(6, 6)$

(E) $(4, 13)$

11. Triangle XYZ is an isosceles right triangle, with $\angle Y$ as the right angle. The sum of sides XY and YZ is best approximated by what percent of the perimeter of $\triangle XYZ$?

(A) 70%

(B) 68%

(C) 65%

(D) 63%

(E) 59%

12. Which of the following functions has its highest point at $(-1, 5)$?

(A) $f(x) = -2(x - 1)^2 - 5$

(B) $f(x) = 2(x + 1)^2 - 5$

(C) $f(x) = -2(x - 1)^2 + 5$

(D) $f(x) = -2(x + 1)^2 + 5$

(E) $f(x) = 2(x + 1)^2 + 5$

-
13. A geometric sequence for positive numbers is given by $x, 2, y, 72, \dots$. What is the value of $x + y$?

(A) 3

(B) $12\frac{1}{3}$

(C) $18\frac{1}{2}$

(D) 36

(E) 37

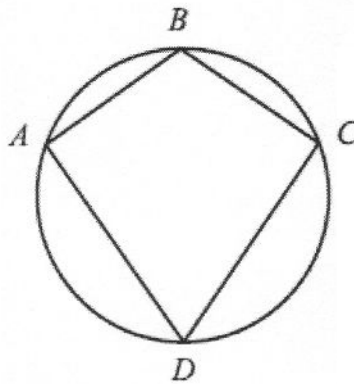
14. Angela, Kim, and Tanya together require 2 hours to paint a kitchen. To complete the job working alone, Angela would need 12 hours and Kim would need 24 hours. How many hours would Tanya need if she were working alone?

(A) 10 (B) 8 (C) 6 (D) $5\frac{1}{3}$ (E) $2\frac{2}{3}$

15. Numbers w , x , and y are all positive. If $wx = 2$, $xy = 9$, and $wy = 8$, what is the value of wxy ?

(A) 1 (B) $5\frac{1}{3}$ (C) 6 (D) 9 (E) 12

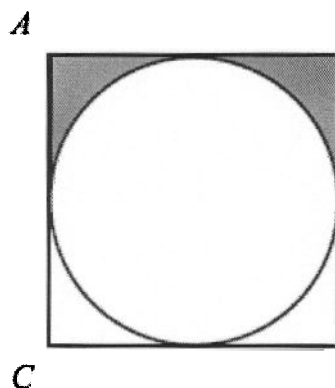
16.



Note: Figure not drawn to scale.

In the figure above, quadrilateral $ABCD$ is inscribed in the circle. If the measure of $\angle B$ is 105° and the measure of $\angle C$ is 95° , what is the measure, in degrees, of arc ABC ?

- (A) 75
(B) 80
(C) 90
(D) 150
(E) 160



The figure above represents a dartboard in which a circle is inscribed in square $ABCD$. The radius of the circle is 4. If a dart is thrown and lands on the dartboard, what is the probability that it landed in a shaded region?

- (A) $\frac{2 - \pi}{\pi}$ (B) $\frac{4 - \pi}{8}$ (C) $\frac{4 - \pi}{\pi}$ (D) $\frac{\pi}{16}$ (E) $\frac{\pi}{8}$

Which of the following is equivalent to

$$\frac{\sqrt{75x^3y^5}}{\sqrt{625x^5y^3}}?$$

- (A) $\frac{y\sqrt{3xy}}{5x\sqrt{xy}}$
- (B) $\frac{5x\sqrt{3xy}}{y\sqrt{x}}$
- (C) $\frac{y\sqrt{3x}}{5x\sqrt{y}}$
- (D) $\frac{5y\sqrt{3}}{x\sqrt{xy}}$
- (E) $\frac{y\sqrt{3xy}}{5x\sqrt{5xy}}$