

1. The perimeter of a rectangle is 40 cm. If the length is 5 more than twice the width, find the length.

- A 5 cm
- B 10 cm
- C 15 cm
- D 20 cm

2. Suppose function  $f(x) = |x|$  is shifted 5 units left and up 2 units. What function of  $g$  models this

- A  $g(x) = |x - 5| + 2$
- B  $g(x) = |x + 5| + 2$
- C  $g(x) = |x - 2| + 5$
- D  $g(x) = |x + 2| - 5$

3. Which of the following correctly expresses  $R$  as a function of  $E$  and  $I$  given the original function below?

$$I = \frac{E}{5R}$$

- A
- B
- C  $R = 5EI$
- D  $R = 5E/I$
- E  $R = 5I/E$
- $R = E/(5I)$
- $R = I/(5E)$

4. The midpoint of a segment is at  $(-5, 2)$ . One of the endpoints is  $(3, 10)$ . What are the coordinates of the other endpoint?

- A  $(-1, 6)$
- B  $(-7, -6)$
- C  $(-13, -6)$
- D  $(-13, 6)$
- E  $(-8, -8)$

5. The cost of buying  $s$  shirts and  $h$  hats can be determined by using the equation  $C = 8s + 4h$ . Suppose you have \$200 to spend. Which of the

- A Each shirt costs \$8.
- B Each hat costs \$4
- C Eight shirts and 12 hats cost \$112.
- D You can buy 15 shirts and 18 hats.
- E You can buy 20 shirts and 15 hats.

6. A company manufactures DVDs.

- The company spent \$247,000 to develop its process for manufacturing the DVDs.
- The company spends an additional \$1.25 to manufacture each DVD.

Which function represents the average total cost per DVD,  $y$ , for the company to manufacture  $x$  total DVDs?

- A  $y = \frac{x}{1.25x}$
- B  $y = \frac{1.25x}{x}$
- C  $y = \frac{x}{1.25x + 247,000}$
- D  $y = \frac{1.25x + 247,000}{x}$

7. Twenty-one students at a school have an allergy to peanuts, shellfish, or both.

- Fourteen students at the school are allergic to peanuts.
- Twelve students at the school are allergic to shellfish.

How many of the students are allergic to both peanuts and shellfish?

- A 12
- B 7
- C 5
- D 2

8. A city map is placed on a coordinate grid. The post office is located at the point  $P(5, 35)$ , the library is located at the point  $L(15, 10)$ , and the fire station is located at the point  $F(9, 25)$ . What is the ratio of the length of  $\overline{PF}$  to the length of  $\overline{LF}$ ?

- A 2 : 3
- B 3 : 2
- C 2 : 5
- D 3 : 5

9. The value,  $V$ , of a car can be modeled by the function  $V(t) = 13,000(0.82)^t$ , where  $t$  is the number of years since the car was purchased. To the nearest tenth of a percent, what is the monthly rate of depreciation?

- A 1.5%
- B 1.6%
- C 9.2%
- D 18.0%

10. Which expression is equivalent to  $\left(\frac{16x^{\frac{1}{5}}y^{-2}}{x^{\frac{1}{5}}y^6}\right)^{\frac{3}{2}}$ ?

- A  $24x^{\frac{9}{2}}y^{\frac{9}{2}}$
- B  $\frac{24x^{\frac{3}{4}}}{y^9}$
- C  $\frac{64}{x^{\frac{1}{2}}y^8}$
- D  $\frac{64x^{\frac{1}{2}}}{y^{12}}$