

1

$$2z + 1 = z$$

What value of z satisfies the equation above?

- A) -2
- B) -1
- C) $\frac{1}{2}$
- D) 1

2

A television with a price of \$300 is to be purchased with an initial payment of \$60 and weekly payments of \$30. Which of the following equations can be used to find the number of weekly payments, w , required to complete the purchase, assuming there are no taxes or fees?

- A) $300 = 30w - 60$
- B) $300 = 30w$
- C) $300 = 30w + 60$
- D) $300 = 60w - 30$

3

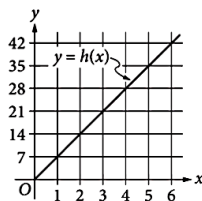
Shipping Charges

Merchandise weight (pounds)	Shipping charge (\$)
5	16.94
10	21.89
20	31.79
40	51.59

The table above shows shipping charges for an online retailer that sells sporting goods. There is a linear relationship between the shipping charge and the weight of the merchandise. Which function can be used to determine the total shipping charge $f(x)$, in dollars, for an order with a merchandise weight of x pounds?

- A) $f(x) = 0.99x$
- B) $f(x) = 0.99x + 11.99$
- C) $f(x) = 3.39x$
- D) $f(x) = 3.39x + 16.94$

4



The line in the xy -plane above represents the relationship between the height $h(x)$, in feet, and the base diameter x , in feet, for cylindrical Doric columns in ancient Greek architecture. How much greater is the height of a Doric column that has a base diameter of 5 feet than the height of a Doric column that has a base diameter of 2 feet?

- A) 7 feet
- B) 14 feet
- C) 21 feet
- D) 24 feet

5

$$\sqrt{9x^2}$$

If $x > 0$, which of the following is equivalent to the given expression?

- A) $3x$
- B) $3x^2$
- C) $18x$
- D) $18x^4$

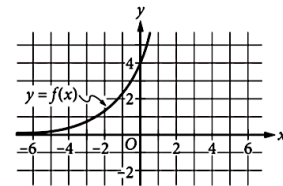
6

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

What are all the values of x that satisfy the equation above?

- A) -3
- B) 0
- C) 1
- D) -3 and -1

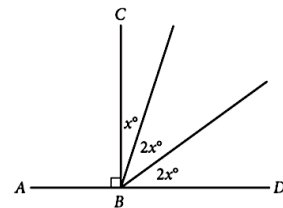
7



The graph of $y = f(x)$ is shown in the xy -plane. What is the value of $f(0)$?

- A) 0
- B) 2
- C) 3
- D) 4

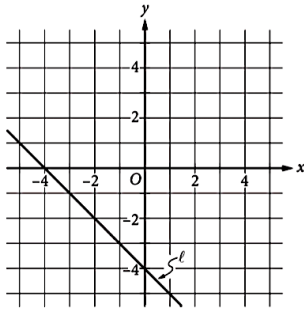
8



In the figure above, point B lies on \overline{AD} . What is the value of $3x$?

- A) 18
- B) 36
- C) 54
- D) 72

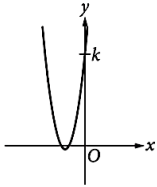
9



Which of the following is an equation of line ℓ in the xy -plane above?

- A) $x - y = -4$
- B) $x - y = 4$
- C) $x + y = -4$
- D) $x + y = 4$

10



The graph of $y = 2x^2 + 10x + 12$ is shown. If the graph crosses the y -axis at the point $(0, k)$, what is the value of k ?

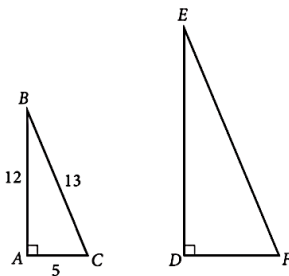
- A) 2
- B) 6
- C) 10
- D) 12

11

A circle in the xy -plane has center $(5, 7)$ and radius 2. Which of the following is an equation of the circle?

- A) $(x - 5)^2 + (y - 7)^2 = 4$
- B) $(x + 5)^2 + (y + 7)^2 = 4$
- C) $(x - 5)^2 + (y - 7)^2 = 2$
- D) $(x + 5)^2 + (y + 7)^2 = 2$

12



In the figure above, triangle ABC is similar to triangle DEF . What is the value of $\cos(E)$?

- A) $\frac{12}{5}$
- B) $\frac{12}{13}$
- C) $\frac{5}{12}$
- D) $\frac{5}{13}$

13

In the xy -plane, the graph of the function $f(x) = x^2 + 5x + 4$ has two x -intercepts. What is the distance between the x -intercepts?

- A) 1
- B) 2
- C) 3
- D) 4

14

$$\sqrt{4x} = x - 3$$

What are all values of x that satisfy the equation above?

- I. 1
- II. 9

- A) I only
- B) II only
- C) I and II
- D) Neither I nor II

15

$$\begin{aligned} -3x + y &= 6 \\ ax + 2y &= 4 \end{aligned}$$

In the system of equations above, a is a constant. For which of the following values of a does the system have no solution?

- A) -6
- B) -3
- C) 3
- D) 6

16

$$T = 5c + 12f$$

A manufacturer shipped units of a certain product to two locations. The equation above shows the total shipping cost T , in dollars, for shipping c units to the closer location and shipping f units to the farther location. If the total shipping cost was \$47,000 and 3000 units were shipped to the farther location, how many units were shipped to the closer location?

17

$$|2x+1|=5$$

If a and b are the solutions to the equation above, what is the value of $|a-b|$?

18

Juan purchased an antique that had a value of \$200 at the time of purchase. Each year, the value of the antique is estimated to increase 10% over its value the previous year. The estimated value of the antique, in dollars, 2 years after purchase can be represented by the expression $200a$, where a is a constant. What is the value of a ?

19

$$2x + 3y = 1200$$

$$3x + 2y = 1300$$

Based on the system of equations above, what is the value of $5x + 5y$?

20

If $u + t = 5$, and $u - t = 2$, what is the value of $(u - t)(u^2 - t^2)$?