

1

What value of  $z$  satisfies the equation above?

A)  $-2$

B)  $-1$

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

D)  $1$

$$\begin{aligned} 2z + 1 &= z \\ -2z &- 2z \\ 1 &= -1z \\ z &= -1 \end{aligned}$$

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)  $f(x) = 0.99x$

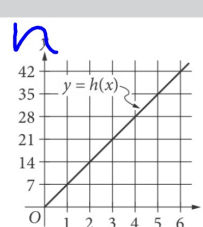
B)  $f(x) = 0.99x + 11.99$

C)  $f(x) = 3.39x$

D)  $f(x) = 3.39x + 16.94$

$$\begin{aligned} y &= mx + b \\ m &= \frac{9.9}{10} = 0.99 \\ y &= 0.99x + b \\ 21.89 &= 0.99(10) + b \\ 21.89 &= 9.9 + b \\ b &= 11.99 \end{aligned}$$

4



$$\begin{aligned} (5, 35) \\ (2, 14) \\ d \quad 35 - 14 \\ = 21 \text{ ft} \end{aligned}$$

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

$$\sqrt{9x^2} = 3x$$

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

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

6

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

$$1(x^2 - 1) = -2(x - 1)$$

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

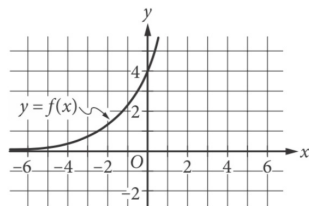
- A)  $-3$
- B)  $0$
- C)  $1$
- D)  $-3$  and  $-1$

$$x^2 - 1 = -2x + 2$$

$$x^2 + 2x - 3 = 0$$

$$x = -3, 1$$

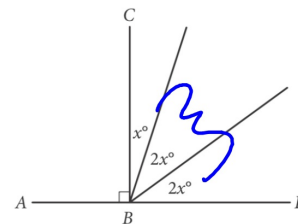
7



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)  $72$

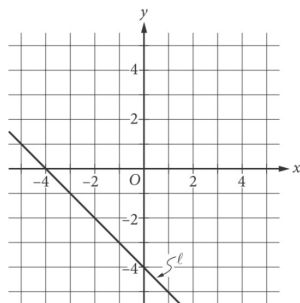
$$5x = 90$$

$$x = 18$$

$$3x = 3(18) = 54$$

$$\frac{18}{3} = 6$$

9



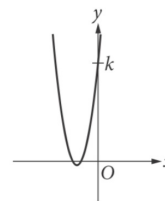
Which of the following is an equation of line  $\ell$  in the  $xy$ -plane above?

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

$$y = x - 4$$

$$y = -x - 4$$

10



$$y = ax^2 + bx + c$$

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.

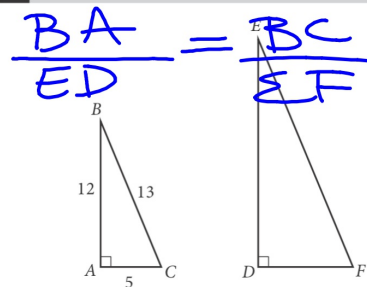
Which of the following is an equation of the circle?

- 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)  $(x + 5)^2 + (y + 7)^2 = 2$

$$(x - h)^2 + (y - k)^2 = r^2$$

$$= 4$$

12



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

- A)  $\frac{12}{5}$   
 B)  $\frac{2}{13}$   
 C)  $\frac{5}{12}$   
 D)  $\frac{5}{13}$

$$\frac{BA}{ED} = \frac{BC}{EF}$$

$$\frac{12}{12} = \frac{13}{13}$$

$$\cos B = \frac{A}{H} = \frac{12}{13}$$

$$\cos E = \frac{A}{H} = \frac{12}{13}$$

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

$$(x+4)(x+1)=0$$

$$x = -4, -1$$

$$0 = x^2 + 5x + 4$$

$$\begin{array}{r} 4 \\ \times 1 \\ \hline 4 \end{array}$$

14

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

What are all values of  $x$  that satisfy the given equation?

- I. 1  
II. 9

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

$$\sqrt{4 \cdot 1} = 1 - 3$$

$$2 = -2$$

$$\sqrt{4 \cdot 9} = 9 - 3$$

$$6 = 6 \checkmark$$

15

$$-3x + y = 6$$

$$ax + 2y = 4$$

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

$$y = mx + b$$

$$-3x + y = 6 \rightarrow y = 3x + 6$$

$$ax + 2y = 4 \rightarrow 2y = -ax + 4$$

$$y = \frac{-a}{2}x + 2$$

$$-\frac{a}{2} = 3$$

16

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?

$$T = 5c + 12f$$

$$+7000 = 5c + 12(3000)$$

$$47000 = 5c + 36000$$

$$11000 = 5c$$

$$c = 2200$$

17

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

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

$$|2 - -3| = 5$$

$$|-3 - 2|$$

$$2x + 1 = -5$$

$$2x = -6$$

$$2x + 1 = 5$$

$$2x = 4$$

$$x = 2 \quad x = -3$$

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  $a$ ?

$$200a = 200(1.1)(1.1)$$

$$a = 1.21$$

19

$$+ \begin{array}{r} 2x + 3y = 1200 \\ 3x + 2y = 1300 \end{array}$$

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

$$5x + 5y = 2500$$

20

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

$$x^2 - 9 = (x + 3)(x - 3)$$

$$(u - t)(u^2 - t^2) = (u - t)(u + t)(u - t)$$

$$(2)(5)(2) = 20$$

*Syllabus & Textbooks*

*Hwk #1 - Signed Syllabus & Semester 1 Reflection*