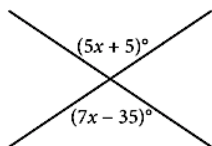


1



Two lines intersect as shown. What is the value of  $x$  ?

- A) 15
- B) 20
- C) 25
- D) 30

2

$$|2x - 4| = 8$$

What is the positive solution to the given equation?

- A) 2
- B) 4
- C) 6
- D) 8

3

Which of the following is equivalent to  $4x^3 + 8x^2$  ?

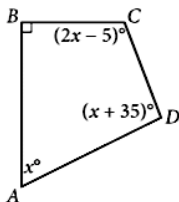
- A)  $12x^5$
- B)  $12x^2(2x + 1)$
- C)  $4x^2(x + 2)$
- D)  $x^2(12 + x)$

4

If  $2n + 12 = 26n$ , what is the value of  $6n$  ?

- A) 8
- B) 4
- C) 3
- D)  $\frac{1}{2}$

5



Quadrilateral  $ABCD$  is shown. Which equation shows how the measures of the angles of the quadrilateral are related?

- A)  $x + 90 + (2x - 5) + (x + 35) = 360$
- B)  $4(x + 90 + (2x - 5) + (x + 35)) = 360$
- C)  $x + (2x - 5) + (x + 35) = 360$
- D)  $4(x + (2x - 5) + (x + 35)) = 360$

6

In right triangle  $ABC$ , the length of side  $\overline{AC}$  is 12, the measure of  $\angle A$  is  $40^\circ$ , and  $\angle B$  is a right angle. Which of the following can be determined using the information given?

- I. The measure of  $\angle C$
- II. The length of side  $\overline{AB}$

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

7

In the  $xy$ -plane, line  $\ell$  has a slope of 2. Line  $k$  is perpendicular to line  $\ell$  and contains the point  $(4, 2)$ . Which of the following is an equation of line  $k$  ?

- A)  $y = -2x - 6$
- B)  $y = -2x + 10$
- C)  $y = -\frac{1}{2}x$
- D)  $y = -\frac{1}{2}x + 4$

8

$$c = \frac{x}{y}$$

The given equation relates the variables  $c$ ,  $x$ , and  $y$ , where  $c > 0$ ,  $x > 0$ , and  $y > 0$ . Which equation correctly expresses  $y$  in terms of  $c$  and  $x$  ?

- A)  $y = cx$
- B)  $y = \frac{1}{cx}$
- C)  $y = \frac{c}{x}$
- D)  $y = \frac{x}{c}$

9

The function  $f$  is a linear function. The  $y$ -intercept of the graph of  $y = f(x)$  in the  $xy$ -plane is  $(0, -12)$ . What is the  $y$ -intercept of the graph of  $y = f(x) + 2$  ?

- A)  $(0, -14)$
- B)  $(0, -10)$
- C)  $(-2, -12)$
- D)  $(2, -12)$

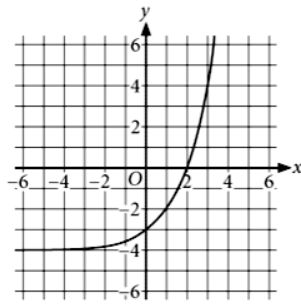
10

Which of the following is(are) an  $x$ -intercept of the graph of  $y = \frac{(x + 3)(x - 2)}{x}$  in the  $xy$ -plane?

- I.  $(-3, 0)$
- II.  $(2, 0)$
- III.  $(0, 0)$

- A) I only
- B) III only
- C) I and II only
- D) I, II and III

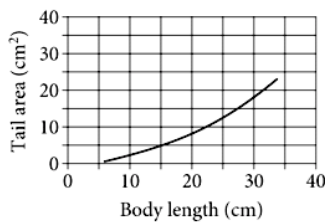
11



The graph of  $y = 2^x - a$  is shown, where  $a$  is a constant. What is the value of  $a$  ?

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

12



For a certain group of fish, the graph models the relationship between body length  $L$ , in centimeters (cm), and tail area  $A$ , in square centimeters ( $\text{cm}^2$ ), where  $6 \leq L \leq 34$ . Which equation represents the relationship between body length and tail area?

- A)  $A = 0.02L^2$
- B)  $A = 1.23L^2$
- C)  $A = 2.02L^2$
- D)  $A = 3.23L^2$

13

$$\begin{aligned} 8x - 4y &= 7 \\ 3x + 6y &= 12 \end{aligned}$$

If  $(x, y)$  is the solution to the given system of equations, what is the value of  $x$  ?

- A) 1.5
- B) 1.25
- C) 0.5
- D) 0.25

14

$$\begin{aligned} y &= 2x + 5 \\ y &= kx + 3 \end{aligned}$$

In the given system of equations,  $k$  is a constant. The system has exactly one solution. Which of the following could be the value of  $k$  ?

- I. 2
  - II. 5
- A) I only
  - B) II only
  - C) I and II
  - D) Neither I nor II

15

$$b(t) = 100(1.11)^t$$

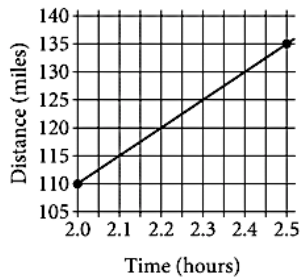
The given function  $b$  models the number of flour beetles in a certain area, where  $t$  represents the number of days after June 1. Which of the following is the best interpretation of the number 1.11 in this context?

- A) The model predicts that there were approximately 1.11 flour beetles in this area on June 1.
- B) The model predicts that the number of flour beetles in this area increases by approximately 1.11 each day.
- C) The model predicts that it will take approximately 1.11 days for the number of flour beetles to double.
- D) The model predicts that the number of flour beetles grows by a factor of approximately 1.11 each day.

16

In the  $xy$ -plane, the graph of  $y = \frac{1}{2}x + b$ , where  $b$  is a constant, intersects the  $x$ -axis at  $(-6, 0)$ . What is the value of  $b$ ?

17



For part of a trip, a car traveled directly away from its starting point at a constant speed. The graph shows the car's distance from its starting point, in miles, for times from 2.0 hours to 2.5 hours after the start of the trip. What was the speed of the car, in miles per hour, during this part of the trip?

18

$$x^2 - 8x + y^2 - 10y = 40$$

In the  $xy$ -plane, the graph of the given equation is a circle. What is the radius of this circle?

19

$$x^2 - 6x + 7 = 0$$

What is the sum of the solutions to the equation above?

20

$$\left(\sqrt{x^3}\right)^a, \text{ where } x \geq 0$$

In the given expression,  $a$  is a constant. The expression is equivalent to  $x^6$ , where  $x \geq 0$ . What is the value of  $a$ ?