

# Question ID 769dc33f

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 769dc33f

| $x$ | $g(x)$ |
|-----|--------|
| 1   | 54     |
| 2   | 51     |
| 3   | 48     |
| 4   | 45     |

◀ ▶

For the linear function  $g$ , the table shows four values of  $x$  and their corresponding values of  $g(x)$ . The function can be written as  $g(x) = mx + b$ , where  $m$  and  $b$  are constants. What is the value of  $b$ ?

- A. 3
- B. 27
- C. 54
- D. 57

# Question ID cf175155

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: cf175155

Caleb used juice to make popsicles. The function  $f(x) = -5x + 30$  approximates the volume, in fluid ounces, of juice Caleb had remaining after making  $x$  popsicles. Which statement is the best interpretation of the  $y$ -intercept of the graph of  $y = f(x)$  in the  $xy$ -plane in this context?

- A. Caleb used approximately 5 fluid ounces of juice for each popsicle.
- B. Caleb had approximately 5 fluid ounces of juice when he began to make the popsicles.
- C. Caleb had approximately 30 fluid ounces of juice when he began to make the popsicles.
- D. Caleb used approximately 30 fluid ounces of juice for each popsicle.

Question ID 260c8cc7

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 260c8cc7

$$g(m) = -0.05m + 12.1$$

The given function  $g$  models the number of gallons of gasoline that remains from a full gas tank in a car after driving  $m$  miles. According to the model, about how many gallons of gasoline are used to drive each mile?

- A. 0.05
- B. 12.1
- C. 20
- D. 242.0

# Question ID 087283ab

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 087283ab

In the  $xy$ -plane, the graph of the linear function  $f$  contains the points  $(0, 2)$  and  $(8, 34)$ . Which equation defines  $f$ , where  $y = f(x)$ ?

- A.  $f(x) = 2x + 42$
- B.  $f(x) = 32x + 36$
- C.  $f(x) = 4x + 2$
- D.  $f(x) = 8x + 2$

# Question ID 88de8eeb

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 88de8eeb

For groups of **25** or more people, a museum charges **\$21** per person for the first **25** people and **\$14** for each additional person. Which function ***f*** gives the total charge, in dollars, for a tour group with ***n*** people, where  **$n \geq 25$** ?

- A.  $f(n) = 14n + 175$
- B.  $f(n) = 14n + 525$
- C.  $f(n) = 35n - 350$
- D.  $f(n) = 14n + 21$

# Question ID ec1ee886

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: ec1ee886

The function  $f$  is defined by  $f(x) = -9x + 9$ . What is the  $y$ -coordinate of the  $y$ -intercept of the graph of  $y = f(x)$  in the  $xy$ -plane?

# Question ID 60ae7d59

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 60ae7d59

The cost of renting a large canopy tent for up to **10** days is **\$430** for the first day and **\$215** for each additional day. Which of the following equations gives the cost ***y***, in dollars, of renting the tent for ***x*** days, where ***x*** is a positive integer and ***x* ≤ 10**?

- A. ***y* = 215*x* + 215**
- B. ***y* = 430*x* − 215**
- C. ***y* = 430*x* + 215**
- D. ***y* = 215*x* + 430**

# Question ID 523437f0

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 523437f0

The function  $h$  is defined by  $h(x) = 4x + 28$ . The graph of  $y = h(x)$  in the  $xy$ -plane has an  $x$ -intercept at  $(a, 0)$  and a  $y$ -intercept at  $(0, b)$ , where  $a$  and  $b$  are constants. What is the value of  $a + b$ ?

- A. 21
- B. 28
- C. 32
- D. 35

# Question ID 110d5a9a

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 110d5a9a

|        |    |     |     |     |
|--------|----|-----|-----|-----|
| $x$    | 10 | 15  | 20  | 25  |
| $f(x)$ | 82 | 137 | 192 | 247 |

The table shows four values of  $x$  and their corresponding values of  $f(x)$ . There is a linear relationship between  $x$  and  $f(x)$  that is defined by the equation  $f(x) = mx - 28$ , where  $m$  is a constant. What is the value of  $m$ ?

Question ID c88c8eeb

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: c88c8eeb

$f(x) = 39$

For the given linear function  $f$ , which table gives three values of  $x$  and their corresponding values of  $f(x)$ ?

A.

| $x$ | $f(x)$ |
|-----|--------|
| 0   | 0      |
| 1   | 0      |
| 2   | 0      |

B.

| $x$ | $f(x)$ |
|-----|--------|
| 0   | 39     |
| 1   | 39     |
| 2   | 39     |

C.

| $x$ | $f(x)$ |
|-----|--------|
| 0   | 0      |
| 1   | 39     |
| 2   | 78     |

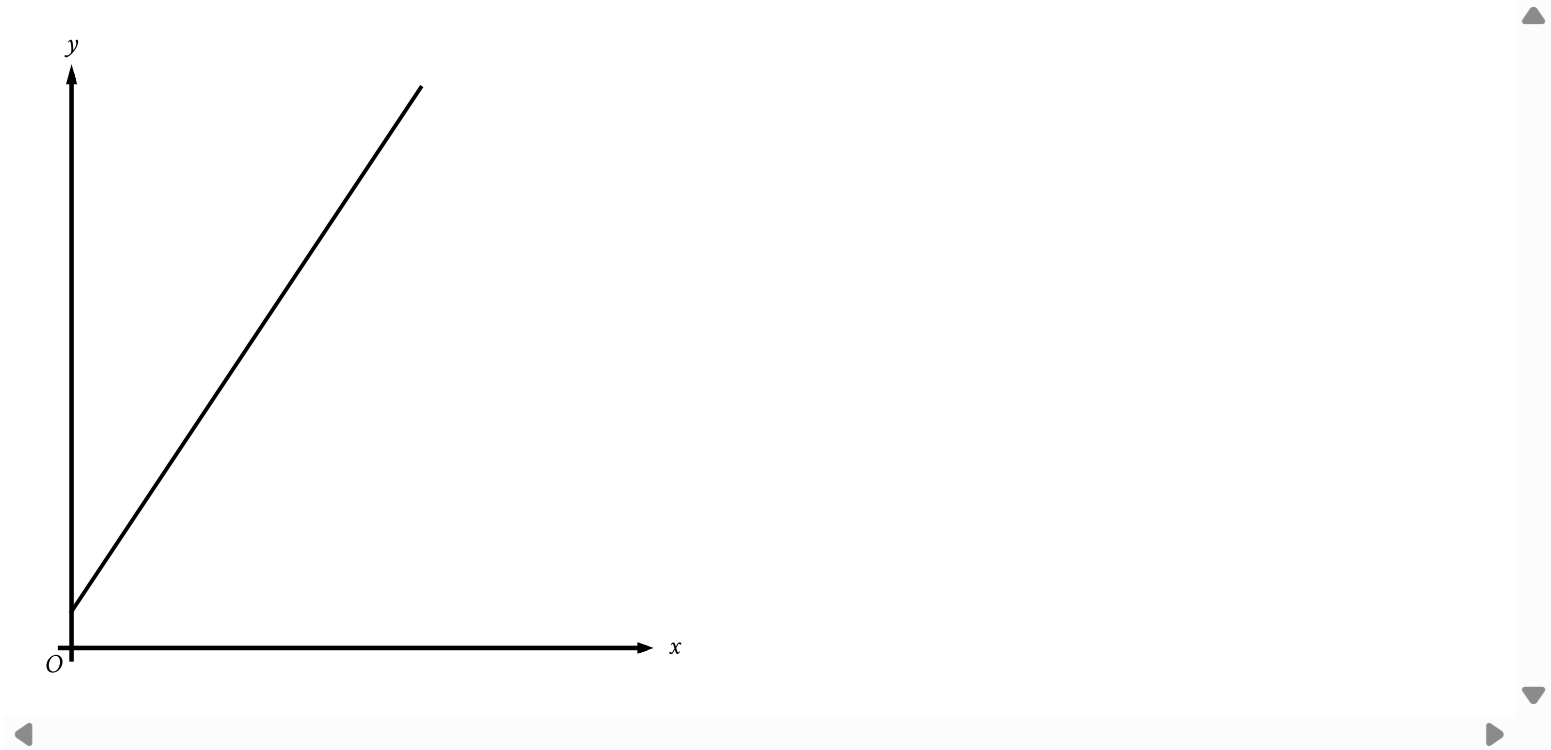
D.

| $x$ | $f(x)$ |
|-----|--------|
| 0   | 39     |
| 1   | 0      |
| 2   | -39    |

# Question ID 6c6d3af5

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 6c6d3af5



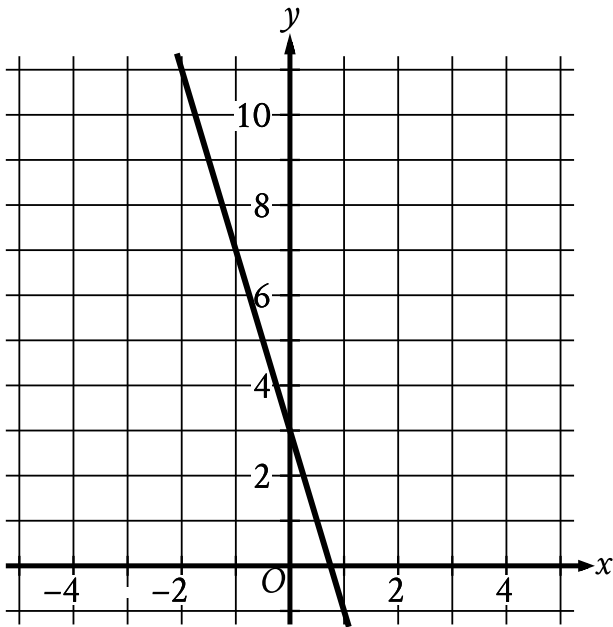
The graph represents the total charge, in dollars, by an electrician for  $x$  hours of work. The electrician charges a onetime fee plus an hourly rate. What is the best interpretation of the slope of the graph?

- A. The electrician’s hourly rate
- B. The electrician’s onetime fee
- C. The maximum amount that the electrician charges
- D. The total amount that the electrician charges

Question ID 82b33e31

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 82b33e31



The graph of the linear function  $y = f(x) + 19$  is shown. If  $c$  and  $d$  are positive constants, which equation could define  $f$ ?

- A.  $f(x) = -d - cx$
- B.  $f(x) = d - cx$
- C.  $f(x) = -d + cx$
- D.  $f(x) = d + cx$

# Question ID 7d304f81

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 7d304f81

If  $f(x) = x + 7$  and  $g(x) = 7x$ , what is the value of  $4f(2) - g(2)$ ?

- A.  $-5$
- B.  $1$
- C.  $22$
- D.  $28$

# Question ID 9bbbda63

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 9bbbda63

| $x$ | $f(x)$ |
|-----|--------|
| 1   | −64    |
| 2   | 0      |
| 3   | 64     |



For the linear function  $f$ , the table shows three values of  $x$  and their corresponding values of  $f(x)$ . Function  $f$  is defined by  $f(x) = ax + b$ , where  $a$  and  $b$  are constants. What is the value of  $a - b$ ?

- A. −64
- B. 62
- C. 128
- D. 192

# Question ID 19312a4a

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 19312a4a

In the linear function  $f$ ,  $f(0) = 8$  and  $f(1) = 12$ . Which equation defines  $f$ ?

- A.  $f(x) = 12x + 8$
- B.  $f(x) = 4x$
- C.  $f(x) = 4x + 12$
- D.  $f(x) = 4x + 8$

Question ID 0fd74d8c

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 0fd74d8c

$$F(x) = \frac{9}{5}(x - 273.15) + 32$$

The function  $F$  gives the temperature, in degrees Fahrenheit, that corresponds to a temperature of  $x$  kelvins. If a temperature increased by **2.10** kelvins, by how much did the temperature increase, in degrees Fahrenheit?

- A. **3.78**
- B. **35.78**
- C. **487.89**
- D. **519.89**

# Question ID 48399aad

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 48399aad

Kaylani used fabric measuring **5** yards in length to make each suit for a men's choir. The relationship between the number of suits that Kaylani made,  $x$ , and the total length of fabric that she purchased  $y$ , in yards, is represented by the equation  $y - 5x = 6$ . What is the best interpretation of **6** in this context?

- A. Kaylani made **6** suits.
- B. Kaylani purchased a total of **6** yards of fabric.
- C. Kaylani used a total of **6** yards of fabric to make the suits.
- D. Kaylani purchased **6** yards more fabric than she used to make the suits.

# Question ID fed23a76

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: fed23a76

The function  $f$  is defined by  $f(x) = \frac{9}{7}x + \frac{8}{7}$ . For what value of  $x$  does  $f(x) = 5$ ?

# Question ID 106a2e0d

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 106a2e0d

The functions  $f$  and  $g$  are defined as  $f(x) = \frac{1}{4}x - 9$  and  $g(x) = \frac{3}{4}x + 21$ . If the function  $h$  is defined as  $h(x) = f(x) + g(x)$ , what is the  $x$ -coordinate of the  $x$ -intercept of the graph of  $y = h(x)$  in the  $xy$ -plane?

# Question ID c82bbc3c

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: c82bbc3c

The function  $f$  is defined by  $f(x) = 7x - 84$ . What is the x-intercept of the graph of  $y = f(x)$  in the xy-plane?

- A.  $(-12, 0)$
- B.  $(-7, 0)$
- C.  $(7, 0)$
- D.  $(12, 0)$

# Question ID 48a16149

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 48a16149

The cost of renting a backhoe for up to 10 days is \$270 for the first day and \$135 for each additional day. Which of the following equations gives the cost  $y$ , in dollars, of renting the backhoe for  $x$  days, where  $x$  is a positive integer and  $x \leq 10$ ?

- A.  $y = 270x - 135$
- B.  $y = 270x + 135$
- C.  $y = 135x + 270$
- D.  $y = 135x + 135$

# Question ID 54a26a52

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 54a26a52

$$f(x) = 2x + 3$$

For the given function  $f$ , the graph of  $y = f(x)$  in the  $xy$ -plane is parallel to line  $j$ . What is the slope of line  $j$ ?

# Question ID 7231c6a5

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 7231c6a5

$$j(x) = mx + 144$$

For the linear function  $j$ ,  $m$  is a constant and  $j(12) = 18$ . What is the value of  $j(10)$ ?

# Question ID 9125e98c

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 9125e98c

$$f(x) = 2x + 244$$

The given function  $f$  represents the perimeter, in **centimeters (cm)**, of a rectangle with a length of  $x$  **cm** and a fixed width. What is the width, in **cm**, of the rectangle?

- A. 2
- B. 122
- C. 244
- D. 488

# Question ID d2c01cfd

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: d2c01cfd

The equation  $h = \frac{9(v-273.15)}{5} + 32$  gives the corresponding temperature  $h$ , in degrees Fahrenheit, of any substance that has a temperature of  $v$  kelvins, where  $v > 0$ . If a substance has a temperature of **467.33** degrees Fahrenheit, what is the corresponding temperature, in kelvins, of this substance?

# Question ID 9bf6ba98

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 9bf6ba98

A model predicts that a certain animal weighed **241** pounds when it was born and that the animal gained **3** pounds per day in its first year of life. This model is defined by an equation in the form  $f(x) = a + bx$ , where  $f(x)$  is the predicted weight, in pounds, of the animal  $x$  days after it was born, and  $a$  and  $b$  are constants. What is the value of  $a$ ?

# Question ID 0d38cc32

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 0d38cc32

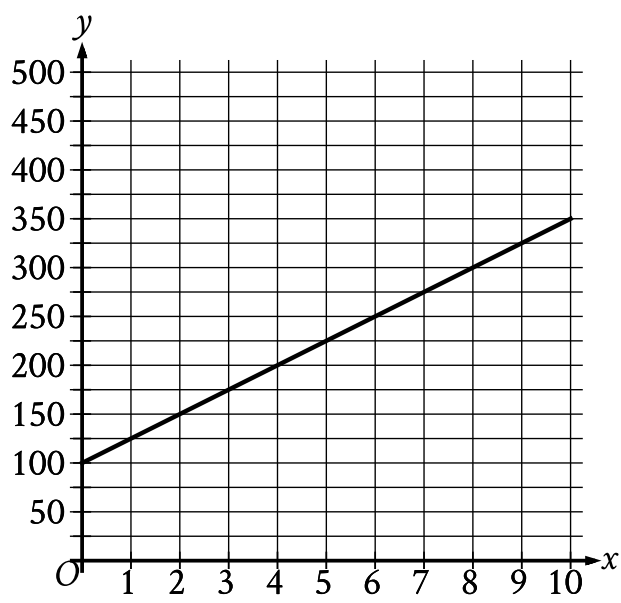
The function  $f$  is defined by  $f(x) = \frac{x+15}{5}$ , and  $f(a) = 10$ , where  $a$  is a constant. What is the value of  $a$ ?

- A. 5
- B. 10
- C. 35
- D. 65

Question ID 0e08f8e9

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 0e08f8e9



The graph of the function  $f$ , where  $y = f(x)$ , gives the total cost  $y$ , in dollars, for a certain video game system and  $x$  games. What is the best interpretation of the slope of the graph in this context?

- A. Each game costs \$25.
- B. The video game system costs \$100.
- C. The video game system costs \$25.
- D. Each game costs \$100.

# Question ID 3b65a247

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 3b65a247

$$f(x) = 45x + 600$$

The function  $f$  gives the monthly fee  $f(x)$ , in dollars, a facility charges to keep  $x$  crates in storage. What is the monthly fee, in dollars, the facility charges to keep  $50$  crates in storage?

# Question ID edbc90e5

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: edbc90e5

The pressure exerted on a scuba diver at sea level is **14.70 pounds per square inch (psi)**. For each foot the scuba diver descends below sea level, the pressure exerted on the scuba diver increases by **0.44 psi**. What is the total pressure, in **psi**, exerted on the scuba diver at **105** feet below sea level?

- A. **60.90**
- B. **31.50**
- C. **14.70**
- D. **0.44**

# Question ID 7e946c43

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 7e946c43

In the linear function  $h$ ,  $h(28) = 15$  and  $h(26) = 22$ . Which equation defines  $h$ ?

- A.  $h(x) = -\frac{2}{7}x + 23$
- B.  $h(x) = -\frac{2}{7}x + 113$
- C.  $h(x) = -\frac{7}{2}x + 23$
- D.  $h(x) = -\frac{7}{2}x + 113$

# Question ID c31c23f7

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: c31c23f7

The table gives the number of hours,  $h$ , of labor and a plumber’s total charge  $f(h)$ , in dollars, for two different jobs.

| $h$ | $f(h)$ |
|-----|--------|
| 1   | 155    |
| 3   | 285    |

There is a linear relationship between  $h$  and  $f(h)$ . Which equation represents this relationship?

- A.  $f(h) = 25h + 130$
- B.  $f(h) = 130h + 25$
- C.  $f(h) = 65h + 90$
- D.  $f(h) = 90h + 65$

# Question ID 7e74c4fb

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 7e74c4fb

One gallon of paint will cover **220** square feet of a surface. A room has a total wall area of *w* square feet. Which equation represents the total amount of paint *P*, in gallons, needed to paint the walls of the room twice?

- A.  $P = \frac{w}{110}$
- B.  $P = 440w$
- C.  $P = \frac{w}{220}$
- D.  $P = 220w$

# Question ID 936b2fd4

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 936b2fd4

A linear function  $f$  gives a company’s profit, in dollars, for selling  $x$  items. The company’s profit is \$220 when it sells 8 items, and its profit is \$320 when it sells 10 items. Which equation defines  $f$ ?

- A.  $f(x) = 150x - 320$
- B.  $f(x) = 32x$
- C.  $f(x) = 50x - 10x$
- D.  $f(x) = 50x - 180$

# Question ID 88e60b4c

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 88e60b4c

The relationship between two variables,  $x$  and  $y$ , is linear. For every increase in the value of  $x$  by 1, the value of  $y$  increases by 8. When the value of  $x$  is 2, the value of  $y$  is 18. Which equation represents this relationship?

- A.  $y = 2x + 18$
- B.  $y = 2x + 8$
- C.  $y = 8x + 2$
- D.  $y = 3x + 26$

# Question ID c1aad368

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: c1aad368

The cost of renting a carpet cleaner is **\$52** for the first day and **\$26** for each additional day. Which of the following functions gives the cost  $C(d)$ , in dollars, of renting the carpet cleaner for  $d$  days, where  $d$  is a positive integer?

- A.  $C(d) = 26d + 26$
- B.  $C(d) = 26d + 52$
- C.  $C(d) = 52d - 26$
- D.  $C(d) = 52d + 78$

# Question ID 7d6cb142

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 7d6cb142

For the linear function  $g$ , the graph of  $y = g(x)$  in the  $xy$ -plane has a slope of  $2$  and passes through the point  $(1, 14)$ . Which equation defines  $g$ ?

- A.  $g(x) = 2x$
- B.  $g(x) = 2x + 2$
- C.  $g(x) = 2x + 12$
- D.  $g(x) = 2x + 14$

# Question ID d0fc9d47

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: d0fc9d47

| Distance (kilometers) | Average time (minutes) |
|-----------------------|------------------------|
| 0.32                  | 8                      |
| 0.56                  | 14                     |
| 0.68                  | 17                     |



The table gives the average time  $t$ , in minutes, it takes Carly to travel a certain distance  $d$ , in kilometers. Which equation could represent this linear relationship?

- A.  $t = 4d$
- B.  $t = \frac{1}{25}d$
- C.  $t = 25d$
- D.  $t = \frac{1}{4}d$

# Question ID da874bf4

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: da874bf4

| Number of cars | Maximum number of passengers and crew |
|----------------|---------------------------------------|
| 3              | 174                                   |
| 5              | 284                                   |
| 10             | 559                                   |



The table shows the linear relationship between the number of cars,  $c$ , on a commuter train and the maximum number of passengers and crew,  $p$ , that the train can carry. Which equation represents the linear relationship between  $c$  and  $p$ ?

- A.  $55c - p = -9$
- B.  $55c - p = 9$
- C.  $55p - c = -9$
- D.  $55p - c = 9$

Question ID dd3cc86f

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: dd3cc86f

| $x$             | $f(x)$ |
|-----------------|--------|
| $-4$            | $0$    |
| $-\frac{19}{5}$ | $1$    |
| $-\frac{18}{5}$ | $2$    |

For the linear function  $f$ , the table shows three values of  $x$  and their corresponding values of  $f(x)$ . If  $h(x) = f(x) - 13$ , which equation defines  $h$ ?

- A.  $h(x) = 5x - 4$
- B.  $h(x) = 5x + 7$
- C.  $h(x) = 5x + 9$
- D.  $h(x) = 5x + 20$

# Question ID 4b88cf78

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 4b88cf78

For the function  $f$ ,  $f(cx) = x - 8$  for all values of  $x$ , where  $c$  is a positive constant. If  $f(2) = 35$ , what is the value of  $c$ ?

# Question ID 04f7e802

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 04f7e802

The function  $f$  is defined by  $f(x) = 4x + k(x - 1)$ , where  $k$  is a constant, and  $f(5) = 32$ . What is the value of  $f(10)$ ?

# Question ID 9c322a51

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 9c322a51

$$h(x) = x + b$$

For the linear function  $h$ ,  $b$  is a constant and  $h(0) = 45$ . What is the value of  $b$ ?

Question ID 58bb1320

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 58bb1320

Scientists collected fallen acorns that each housed a colony of the ant species *P. ohioensis* and analyzed each colony's structure. For any of these colonies, if the colony has  $x$  worker ants, the equation  $y = 0.67x + 2.6$ , where  $20 \leq x \leq 110$ , gives the predicted number of larvae,  $y$ , in the colony. If one of these colonies has 58 worker ants, which of the following is closest to the predicted number of larvae in the colony?

- A. 41
- B. 61
- C. 83
- D. 190

# Question ID 7a1be251

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 7a1be251

The function  $f(x)$  is defined as **19** more than **4** times a number  $x$ . If  $y = f(x)$  is graphed in the  $xy$ -plane, what is the best interpretation of the  $x$ -intercept?

- A. When  $f(x) = 0$ , the number is  $-\frac{19}{4}$ .
- B. When the number is **0**,  $f(x) = 19$ .
- C. The value of  $f(x)$  increases by **1** for each increase of **4** in the value of the number.
- D. For each increase of **1** in the value of the number,  $f(x)$  increases by **4**.

Question ID e8bf6ee9

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: e8bf6ee9

| $x$   | $y$   |
|-------|-------|
| $-12$ | $-45$ |
| $6$   | $45$  |

The table shows two values of  $x$  and their corresponding values of  $y$ . The graph of the linear equation representing this relationship passes through the point  $\left(\frac{1}{4}, a\right)$ . What is the value of  $a$ ?

Question ID 26447f61

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 26447f61

The linear function  $g$  is defined by  $g(x) = b - 15x$ , where  $b$  is a constant. If  $g(c + 7) = \frac{c}{4}$ , where  $c$  is a constant, which of the following expressions represents the value of  $b$ ?

- A.  $\frac{15c}{4}$
- B.  $\frac{19c}{4} + 7$
- C.  $\frac{61c}{4} + 105$
- D.  $15c + 105$

Question ID 707ab9fc

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 707ab9fc

The function  $f(x) = 55.20 - 0.16x$  gives the estimated surface water temperature  $f(x)$ , in degrees Celsius, of a body of water on the  $x$ th day of the year, where  $220 \leq x \leq 360$ . Based on the model, what is the estimated surface water temperature, in degrees Celsius, of this body of water on the 326th day of the year?

- A. 55.20
- B. 3.04
- C. −0.16
- D. −52.16

# Question ID 203cc508

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 203cc508

In the  $xy$ -plane, the graph of the linear function  $f$  contains the points  $(0, 3)$  and  $(7, 31)$ . Which equation defines  $f$ , where  $y = f(x)$ ?

- A.  $f(x) = 28x + 34$
- B.  $f(x) = 3x + 38$
- C.  $f(x) = 4x + 3$
- D.  $f(x) = 7x + 3$

# Question ID 531fb5d2

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 531fb5d2

One gallon of stain will cover **170** square feet of a surface. A yard has a total fence area of *w* square feet. Which equation represents the total amount of stain *S*, in gallons, needed to stain the fence in this yard twice?

- A.  $S = \frac{w}{170}$
- B.  $S = 170w$
- C.  $S = 340w$
- D.  $S = \frac{w}{85}$

# Question ID ec7acab0

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: ec7acab0

For the linear function  $h$ , the graph of  $y = h(x)$  in the  $xy$ -plane passes through the points  $(7, 21)$  and  $(9, 25)$ . Which equation defines  $h$ ?

- A.  $h(x) = \frac{1}{2}x - \frac{7}{2}$
- B.  $h(x) = 2x + 7$
- C.  $h(x) = 7x + 21$
- D.  $h(x) = 9x + 25$

Question ID 8504aff2

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 8504aff2

$w(t) = 300 - 4t$

The function  $w$  models the volume of liquid, in milliliters, in a container  $t$  seconds after it begins draining from a hole at the bottom. According to the model, what is the predicted volume, in milliliters, draining from the container each second?

- A. 300
- B. 296
- C. 75
- D. 4

# Question ID 815e56ab

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 815e56ab

In the  $xy$ -plane, line  $k$  has a slope of  $5$  and a  $y$ -intercept of  $(0, -35)$ . What is the  $x$ -coordinate of the  $x$ -intercept of line  $k$ ?

# Question ID c8f5a3c2

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: c8f5a3c2

A linear model estimates the population of a city from **1991** to **2015**. The model estimates the population was **57** thousand in **1991**, **224** thousand in **2011**, and  $x$  thousand in **2015**. To the nearest whole number, what is the value of  $x$ ?

Question ID 82bfd550

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 82bfd550

$$F(x) = \frac{9}{5}(x - 273.15) + 32$$

The function  $F$  gives the temperature, in degrees Fahrenheit, that corresponds to a temperature of  $x$  kelvins. If a temperature increased by  $9.10$  kelvins, by how much did the temperature increase, in degrees Fahrenheit?

- A. 16.38
- B. 48.38
- C. 475.29
- D. 507.29

# Question ID 0522e6f0

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 0522e6f0

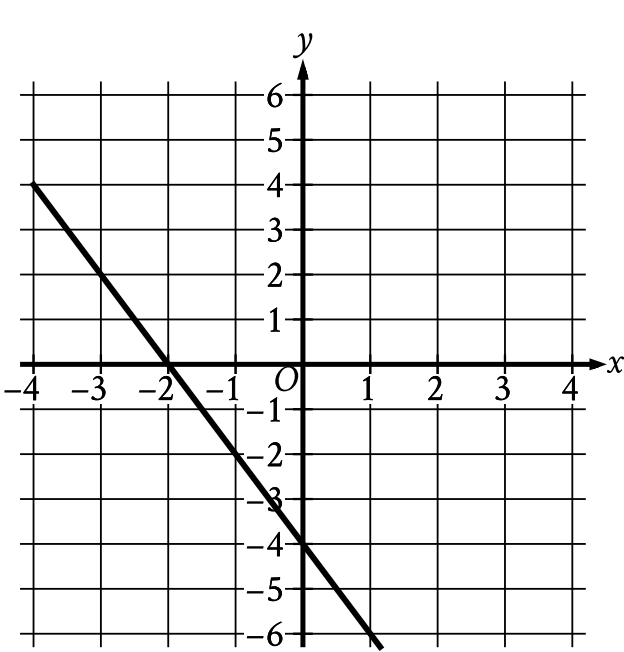
Brian saves  $\frac{2}{5}$  of the **\$215** he earns each week from his job. If Brian continues to save at this rate, how much money, in dollars, will Brian save in **9** weeks?

Question ID 3608a9d6

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 3608a9d6

The graph of  $y = f(x) - 11$  is shown.



Which equation defines the linear function  $f$ ?

- A.  $f(x) = -13x - 11$
- B.  $f(x) = -2x + 7$
- C.  $f(x) = -13x + 7$
- D.  $f(x) = -2x - 11$

# Question ID 4c602c2e

| Assessment | Test | Domain  | Skill            | Difficulty                                   |
|------------|------|---------|------------------|----------------------------------------------|
| PSAT 8/9   | Math | Algebra | Linear functions | <div><div></div><div></div><div></div></div> |

ID: 4c602c2e

A window repair specialist charges \$220 for the first two hours of repair plus an hourly fee for each additional hour. The total cost for 5 hours of repair is \$400. Which function  $f$  gives the total cost, in dollars, for  $x$  hours of repair, where  $x \geq 2$ ?

- A.  $f(x) = 60x + 100$
- B.  $f(x) = 60x + 220$
- C.  $f(x) = 80x$
- D.  $f(x) = 80x + 220$