Question 1

$4x + 9 = 25$

Which equation has the same solution as the given equation?

A) $4x = 120$

B) $4x = 32$

C) $4x = 16$

D) $4x = 4$

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Question 1 Solution

$4x + 9 = 25$

Which equation has the same solution as the given equation?

A) $4x = 120$

B) $4x = 32$

C) $4x = 16$ ✓

D) $4x = 4$

$4x + 9 = 25$

$4x = 25 - 9$

$4x = 16$

Tip: Instead of finding the value of “x”, we saw that all options are with 4x and we did not have to do lots of calculations and saved time.

Question 2

$3x + 7 = 127$

What is the solution to the given equation?

Question 2 Solution

$3x + 7 = 127$

What is the solution to the given equation?

$$3x + 7 = 127$$

$$3x = 127 - 7$$

$$3x = 120$$

$$x = 120 \div 3 = 40$$ ✓

Question 3

If $|4x - 4| = 124$, what is the negative value of $x - 1$?

Question 3 Solution

If $|4x - 4| = 124$, what is the negative value of $x - 1$?

$|4x - 4| = 124$

$4x - 4 = 124$

$4x - 4 = -124$

$4x - 4 = 4(x-1) = -124$

$x - 1 = -124 \div 4 = -31$ ✓

Tip: Instead of finding the value of "x", we saw that the value of x-1 is asked, and we found the answer faster.

Question 4

If $4x + 2 = 11$, what is the value of $12x + 6$?

Question 4 Solution

If $4x + 2 = 11$, what is the value of $12x + 6$?

$12x + 6 = 3(4x+2)$

$12x + 6 = 3(11) = 33$ ✓

Tip: Trying to find the value of x will cost you time and complex calculations in these types of questions. So, look for the shortcuts.

Question 5

If 6+x = 11, what is the value of 14 + 4x ?

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Question 5 Solution

If 6+x = 11, what is the value of 14 + 4x ?

$$6+x = 11$$

$$x = 11-6 = 5$$

$$14+4x = 14 + 4(5) = 34 \quad ✓$$

Question 6

4 more than 7 times a number *x* is equal to 74. Which equation represents the situation?

A) (4)(7)x = 74

B) 7x = 74 + 3

C) 4x + 7 = 74

D) 7x + 4 = 74

Question 6 Solution

4 more than 7 times a number *x* is equal to 74. Which equation represents the situation?

A) (4)(7)x = 74

B) 7x = 74 + 3

C) 4x + 7 = 74

D) 7x + 4 = 74 ✓

7x + 4 = 74

Question 7

$|x - 7| = 8$

What is one possible solution to the given equation?

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Question 7 Solution

$|x - 7| = 8$

What is one possible solution to the given equation?

$|x - 7| = 8$

$x - 7 = 8 \longrightarrow x = 8 + 7 = 15$ ✓

$x - 7 = -8 \longrightarrow x = -8 + 7 = -1$ ✓

Question 8

If $3x - 24 = -18$, what is the value of $x - 5$?

What is one possible solution to the given equation?

A) -18

B) -16

C) -3

D) -1

Question 8 Solution

If $3x - 24 = -18$, what is the value of $x - 5$?

What is one possible solution to the given equation?

A) -18

B) -16

C) -3 ✓

D) -1

$3x = 24 - 18 = 6$

$x = 2$

$x - 5 = 2 - 5 = -3$

Question 9

$(x+1)(x-7)(x+11) = 0$

What is a positive solution to the given equation?

A) 2

B) 4

C) 7

D) 12

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Question 9 Solution

$(x+1)(x-7)(x+11) = 0$

What is a positive solution to the given equation?

A) 2

B) 4

C) 7 ✓

D) 12

$x + 1 \Rightarrow x = -1$

$x - 7 \Rightarrow x = 7$ ✓

$x + 11 \Rightarrow x = -11$

Question 10

$-3x + 21px = 84$

In the given equation, p is a constant. The equation has no solution. What is the value of p?

A) 0

B) $\frac{1}{7}$

C) $\frac{4}{3}$

D) 4

Question 10 Solution

-3x + 21px = 84

A linear equation in one variable has no solution if and only if the equation is false

In the given equation, p is a constant. The equation has no solution. What is the value of p?

A) 0

B) $\frac{1}{7}$ ✓

C) $\frac{4}{3}$

D) 4

-3x (1 - 7p) = 84

x (1 - 7p) = -28

$x = \frac{-28}{1-7p}$ $\quad 1 - 7p = 0$ $\quad p = \frac{1}{7}$

Question 1

$s = 25 + 2t$

The equation gives the speed *s*, in miles per hour, of a certain car *t* seconds after it began to accelerate. What is the speed, in miles per hour, of the car 7 seconds after it began to accelerate?

A) 25

B) 32

C) 42

D) 52

Question 1 Solution

$s = 25 + 2t$

The equation gives the speed *s*, in miles per hour, of a certain car *t* seconds after it began to accelerate. What is the speed, in miles per hour, of the car 7 seconds after it began to accelerate?

A) 25

B) 32

C) 39 ✓

D) 46

$s = 25 + 2(7)$

$s = 25 + 14 = 39$

Question 2

A teacher is creating an assignment worth 80 points. The assignment will consist of questions worth 2 points and questions worth 4 points. Which equation represents this situation, where x represents the number of 2-point questions and y represents the number of 4-point questions?

A) $6xy = 80$
B) $6(x+y) = 80$
C) $4x+2y = 80$
D) $2x + 4y = 80$

Question 2 Solution

A teacher is creating an assignment worth 80 points. The assignment will consist of questions worth 2 points and questions worth 4 points. Which equation represents this situation, where x represents the number of 2-point questions and y represents the number of 4-point questions?

A) $6xy = 80$
B) $6(x+y) = 80$
C) $4x+2y = 80$
D) $2x + 4y = 80$ ✓

2-point questions total point = $2x$
4-point questions total point = $4y$
$2x + 4y = 80$

Question 3

In a certain exam, the minimum score a student can get is 200 points. For each correct answer, students earn 3 points, and for every 3 wrong answers, they lose one point. Which equation represents this situation, where S represents the total score, x represents the number of correct answers and y represents the number of wrong answers?

A) $S = 3x - 3y$

B) $S = 3x - y + 200$

C) $S = 3x - \frac{y}{3} + 200$

D) $S = 3x + y$

Question 3 Solution

In a certain exam, the students start the exam with 200 points. For each correct answer, students earn 3 points, and for every 3 wrong answers, they lose one point. Which equation represents this situation, where S represents the total score of a student, x represents the number of correct answers and y represents the number of wrong answers?

A) $S = 3x - 3y$

B) $S = 3x - y + 200$

C) $S = 3x - \frac{y}{3} + 200$ ✓

D) $S = 3x + y$

Points earned with correct answers = 3x

Points lost with wrong answers = $-\frac{y}{3}$

Starting score = 200

$S = 3x - \frac{y}{3} + 200$

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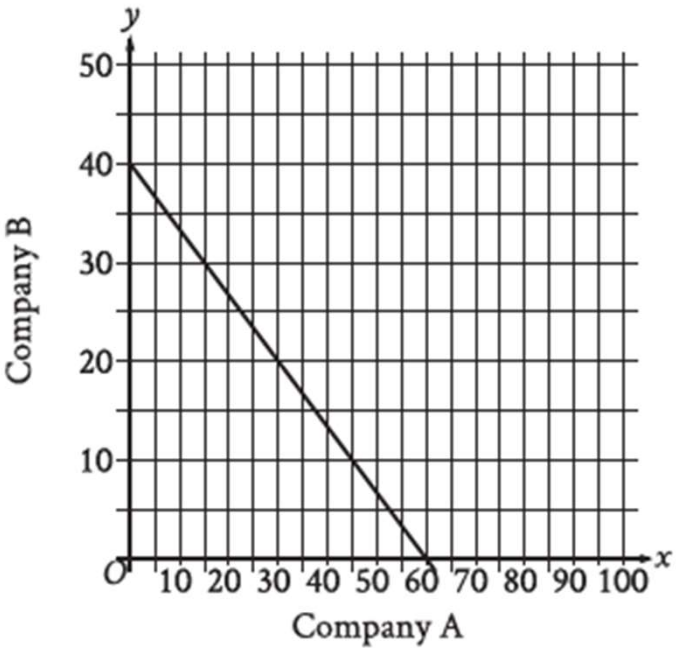
Question 4

The graph shows the relationship between the number of shares of stock from Company A, x, and the number of shares of stock from Company B, y, that Simone can purchase. Which equation could represent this relationship?



A) $y = 8x + 12$
B) $8x + 12y = 480$
C) $Y = 12x + 8$
D) $12x + 8y = 480$

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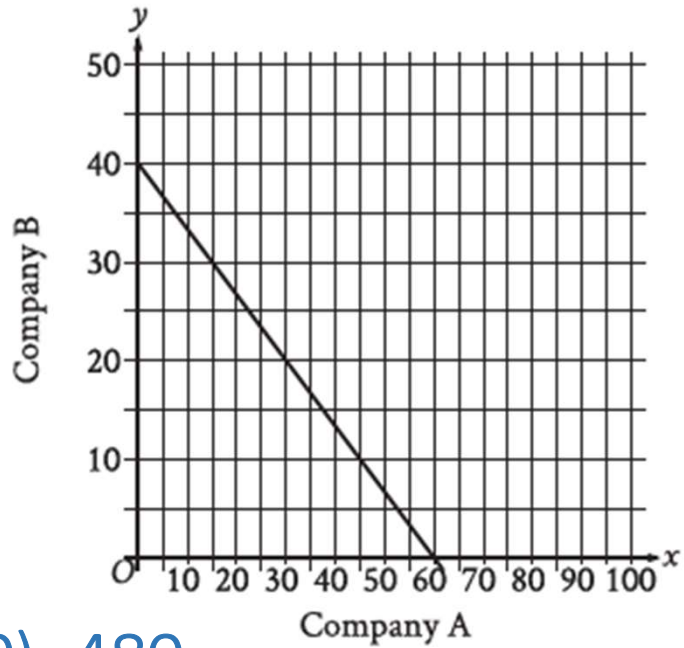
Question 4 Solution

The graph shows the relationship between the number of shares of stock from Company A, x, and the number of shares of stock from Company B, y, that Simone can purchase. Which equation could represent this relationship?



A) $y = 8x + 12$
B) $8x + 12y = 480$ ✓
C) $Y = 12x + 8$
D) $12x + 8y = 480$

$8x + 12y = 480 = 8(0) + 12(40) = 480$

$480 = 480$

$8x + 12y = 480 = 8(0) + 12(40) = 480$

$480 = 480$

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Question 5

For line *l*, the table shows three values of x and their corresponding values of y. Line *h* results from translating line *l* down 5 units in the xy-plane. What is the x-intercept of line *h*?

x	y
12	51
17	66
20	75

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Question 5 Solution

For line *l*, the table shows three values of x and their corresponding values of y. Line *h* results from translating line *l* down 5 units in the xy-plane. What is the x-intercept of line *h*?

x	y	
12	51	(12,51)
17	66	(17,66)
20	75	(20,75)

$y=mx+b$

$m=\frac{66-51}{17-12}=\frac{15}{5}=3$

$y=3x+b$

$51 = 3(12)+b=36+b$

$15 = b$

$y=3x+15$

Line h → $y=3x+15-5=3x+10$

$0=3x+10$

$x=\frac{-10}{3}$

So, x-intercept of line *h* is $(\frac{-10}{3},0)$ ✓

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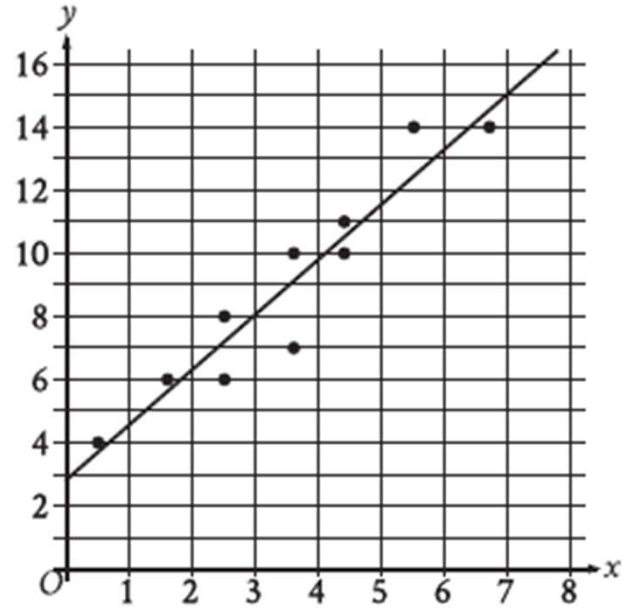
Question 6

The scatterplot shows the relationship between two variables, x and y. A line of best fit is also shown. Which of the following equations best represents the line of best fit shown?



A) y = 2.8 + 1.7x
B) y = 2.8 - 1.7x
C) y = -2.8 + 1.7x
D) y = -2.8 – 1.7x

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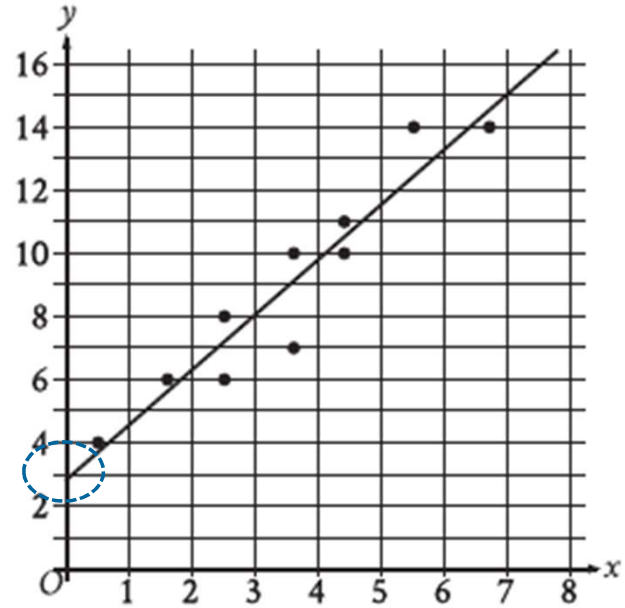
Question 6 Solution

The scatterplot shows the relationship between two variables, x and y. A line of best fit is also shown. Which of the following equations best represents the line of best fit shown?



A) $y = 2.8 + 1.7x$ ✓

~~B) $y = 2.8 - 1.7x$~~

~~C) $y = -2.8 + 1.7x$~~

~~D) $y = -2.8 - 1.7x$~~

$y=mx+b$

Tip: Instead of trying to find the exact equation, we have gone through the options and saved time to solve this question.

Question 7

Ryan walks at a speed of 2.5 miles per hour and runs at a speed of 4 miles per hour. He walks for *w* hours and runs for *r* hours for a combined total of 13 miles. Which equation represents this situation?

A) $2.5w + 4r = 13$

B) $\frac{2}{5}w + \frac{1}{5}r = 13$

C) $5w + 8r = 169$

D) $2.5w + 4r = 10$

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Question 7 Solution

Ryan walks at a speed of 2.5 miles per hour and runs at a speed of 4 miles per hour. He walks for *w* hours and runs for *r* hours for a combined total of 13 miles. Which equation represents this situation?

A) $2.5w + 4r = 13$ ✓

B) $\frac{2}{5}w + \frac{1}{5}r = 13$

C) $5w + 8r = 169$

D) $2.5w + 4r = 10$

Total walked = $2.5w$

Total ran = $4r$

Total ran + walk = $2.5w + 4r = 13$

Question 8

Line *k* is defined by 3y + 12x = 7. Line *p* is perpendicular to line *p* in the xy-place. What is the slope of line *p*?

A) -4

B) $-\frac{1}{4}$

C) 4

D) $\frac{1}{4}$

Question 8 Solution

Line *k* is defined by 3y + 12x = 7. Line *p* is perpendicular to line *p* in the xy-place. What is the slope of line *p*?

A) -4

B) $-\frac{1}{4}$

C) 4

D) $\frac{1}{4}$ ✓

slope of line p is the negative reciprocal of the slope of line k.

y=mx+b ⟹ *m* is the slope, (0,b) is y-intercept.

3y = -12x + 7

$y = -4x + \frac{7}{3}$

⇓

-4 is the slope of line k.

slope of line *p* = $\frac{-1}{-4} = \frac{1}{4}$

Question 9

What is the equation of the line that passes through the point (0,4) and is parallel to the graph of y = 6x + 3 in the xy-plane?

A) y= 4x

B) y = 6x + 4

C) y = 6x

D) y = 4x + 6

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Question 9 Solution

What is the equation of the line that passes through the point (0,4) and is parallel to the graph of y = 6x + 3 in the xy-plane?

~~A) y= 4x~~

B) y = 6x + 4 ✓

C) y = 6x

~~D) y = 4x + 6~~

Slopes of parallel lines are equal.

y=mx+b → *m* is the slope, (0,b) is y-intercept.

y = 6x + 3

↓

6 is the slope of the line.

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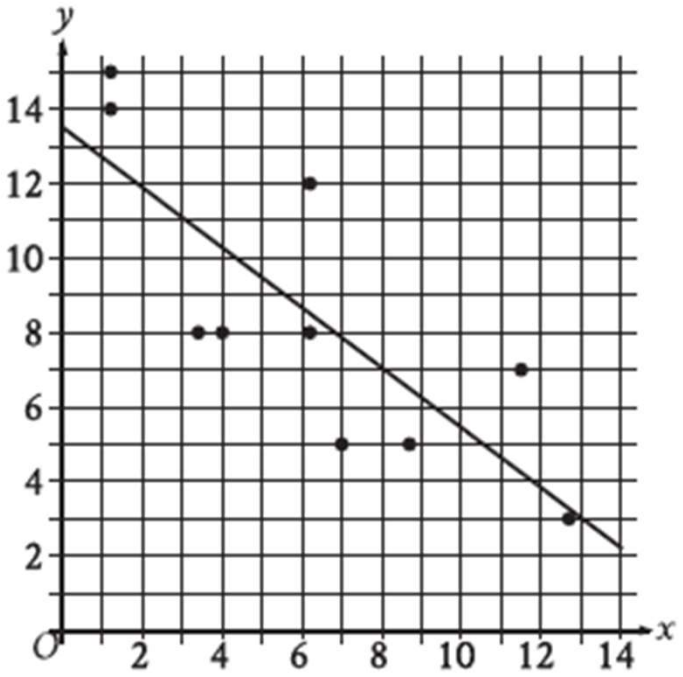
Question 10

The scatterplot shows the relationship between two variables, x and y. A line of best fit is also shown. Which of the following equations best represents the line of best fit shown?



A) y = 13.5x + 0.8x

B) y = 13.5x - 0.8x

C) y = -13.5 + 0.8x

D) y = - 13.5 – 0.8x

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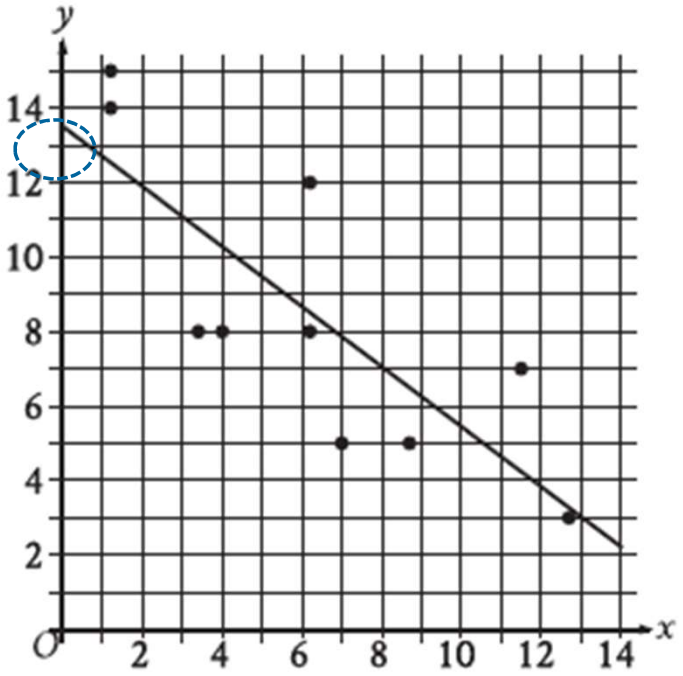
Question 10 Solution

The scatterplot shows the relationship between two variables, x and y. A line of best fit is also shown. Which of the following equations best represents the line of best fit shown?



~~A) y = 13.5 + 0.8x~~

B) y = 13.5 - 0.8x ✓ y=mx+b ⟹ *m* is the slope, (0,b) is y-intercept.

~~C) y = -13.5 + 0.8x~~

~~D) y = -13.5 - 0.8x~~

Question 11

The graph of $7x - 9y = 17$ is translated down 4 units in the xy-plane. What is the x-intercept of the resulting graph?

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Question 11 Solution

The graph of 7x – 9y = 17 is translated down 4 units in the xy-plane. What is the x-intercept of the resulting graph?

$$y = mx + b$$

$$7x = 17 + 9y$$

$$7x - 17 = 9y$$

$$y = \frac{7}{9}x - \frac{17}{9}$$

$$y = \frac{7}{9}x - \frac{17}{9} - 4$$

$$0 = \frac{7}{9}x - \frac{17}{9} - 4 = \frac{7}{9}x - \frac{17}{9} - \frac{36}{9}$$

$$0 = \frac{7}{9}x - \frac{53}{9}$$

$$\frac{7}{9}x = \frac{53}{9} \qquad 7x = 53 \qquad x = \frac{53}{7}$$ ✓

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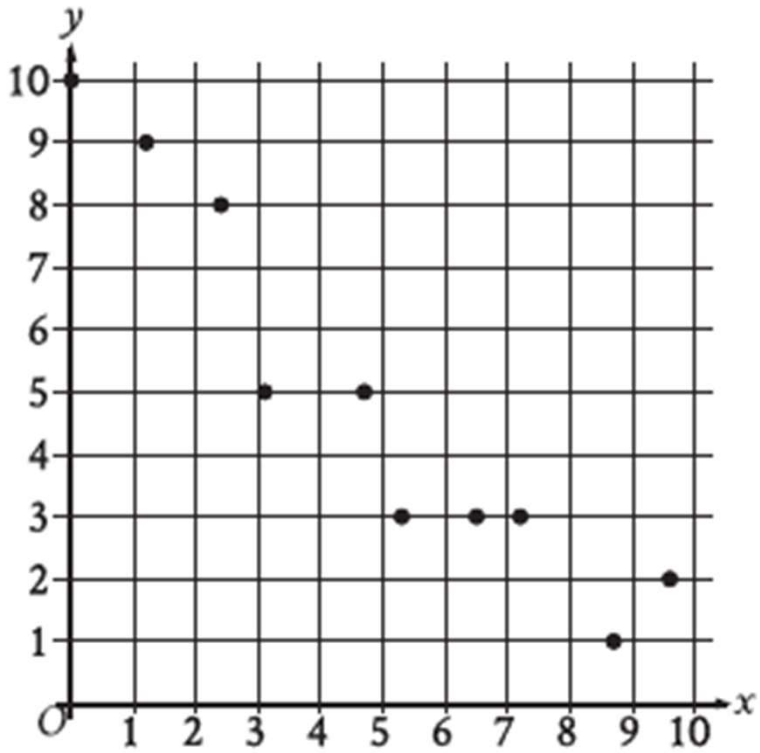
Question 12

Which of the following equations is the most appropriate linear model for the data shown?



A) y = 0.9 + 9.4x

B) y = 0.9 – 9.4x

C) y = 9.4 + 0.9x

D) y = 9.4 – 0.9x

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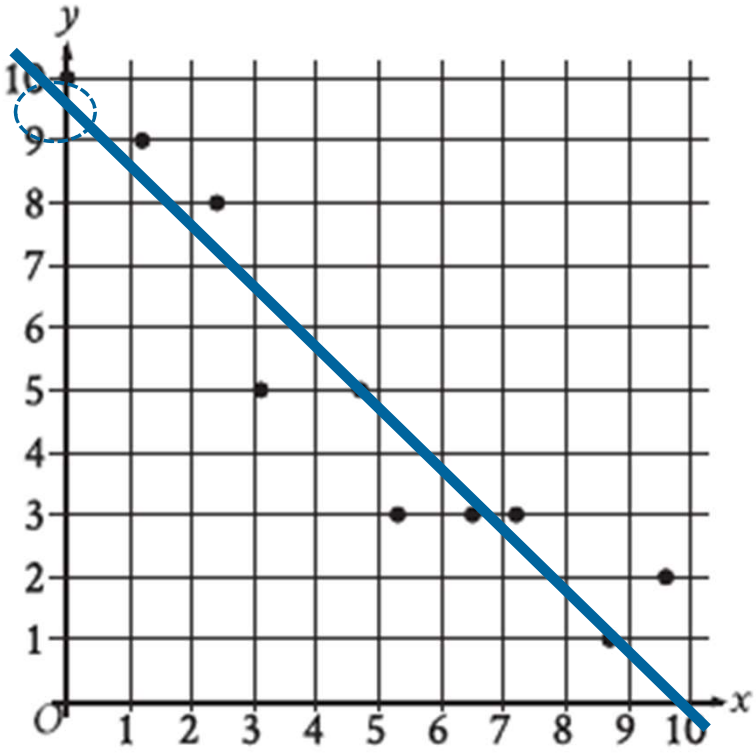
Question 12 Solution

Which of the following equations is the most appropriate linear model for the data shown?



~~A) y = 0.9 + 9.4x~~

B) y = 0.9 – 9.4x

~~C) y = 9.4 + 0.9x~~

D) y = 9.4 – 0.9x ✓

y=mx+b ⟹ *m* is the slope, (0,b) is y-intercept.

Question 13

Line *k* in the xy-plane has a slope of $-\frac{1}{2}$ and passes through the point (5,7). Which equation defines line *k* ?

A) $y = 2x - \frac{1}{2}$

B) $y = -\frac{1}{2}x + 7$

C) $y = -2x + 17$

D) $y = -\frac{1}{2}x + \frac{19}{2}$

Question 13 Solution

Line *k* in the xy-plane has a slope of $-\frac{1}{2}$ and passes through the point (5,7). Which equation defines line *k* ?

A) $y = 2x - \frac{1}{2}$

B) $y = -\frac{1}{2}x + 7$

C) $y = -2x + 17$

D) $y = -\frac{1}{2}x + \frac{19}{2}$ ✓

$y=mx+b$ ⟹ *m* is the slope, (0,b) is y-intercept.

$y= -\frac{1}{2}x + b$

$7= -\frac{1}{2}(5) + b = -\frac{5}{2} + b$

$7 + \frac{5}{2} = b$ $\quad b = \frac{19}{2}$ $\quad y= -\frac{1}{2}x + \frac{19}{2}$

Question 14

The equation x+y=480 represents the number of minutes of operation time during a day for a roller coaster in an entertainment park. x is the number of minutes when the roller coaster is running and y is the number of minutes when the roller coaster is idle. If the roller coaster ran for 328 minutes during a day, how many minutes of idle time does it have?

A) 328

B) 152

C) 440

D) 480

Question 14 Solution

The equation x+y=480 represents the number of minutes of operation time during a day for a roller coaster in an entertainment park. x is the number of minutes when the roller coaster is running and y is the number of minutes when the roller coaster is idle. If the roller coaster ran for 328 minutes during a day, how many minutes of idle time does it have?

A) 328

B) 152 ✓

C) 440

D) 480

Roller Coaster Running Duration = x

Roller Coaster Idle Duration= y

$328 + y = 480$

$y = 480 - 328 = 152$

Question 15

A store sells two different-sized boxes of ice cream. The store's sales of these ice creams totaled 927.82 dollars last month.

The equation $5.92x + 7.02y = 927.82$ represents this situation, where x is the number of small boxes of ice cream sold, and y is the number of larger boxes of ice cream sold. According to the equation, what is the price, in dollars, of each small box of ice cream sold?

Question 15 Solution

A store sells two different-sized boxes of ice cream. The store's sales of these ice creams totaled 927.82 dollars last month.

The equation 5.92x + 7.02y = 927.82 represents this situation, where x is the number of small boxes of ice cream sold, and y is the number of larger boxes of ice cream sold. According to the equation, what is the price, in dollars, of each small box of ice cream sold?

Number of small boxes of ice cream sold = x
Number of larger boxes of ice cream sold = y
Price of Small Box Ice Cream = $5.92 ✓

Question 16

A veterinarian recommends that each day a certain cat should eat 24 calories per pound of the cat's weight, plus an additional 17 calories. Which equation represents this situation, where c is the total number of calories the veterinarian recommends the cat should eat each day if the cat's weight is x pounds?

A) $c = 24x$

B) $c = 41x$

C) $c = 17x + 24$

D) $c = 24x + 17$

Question 16 Solution

A veterinarian recommends that each day a certain cat should eat 24 calories per pound of the cat's weight, plus an additional 17 calories. Which equation represents this situation, where c is the total number of calories the veterinarian recommends the cat should eat each day if the cat's weight is x pounds?

A) c = 24x

B) c = 41x

C) c = 17x +24

D) c = 24x + 17 ✓

24(x) = 24x

24x + 17

c= 24x + 17

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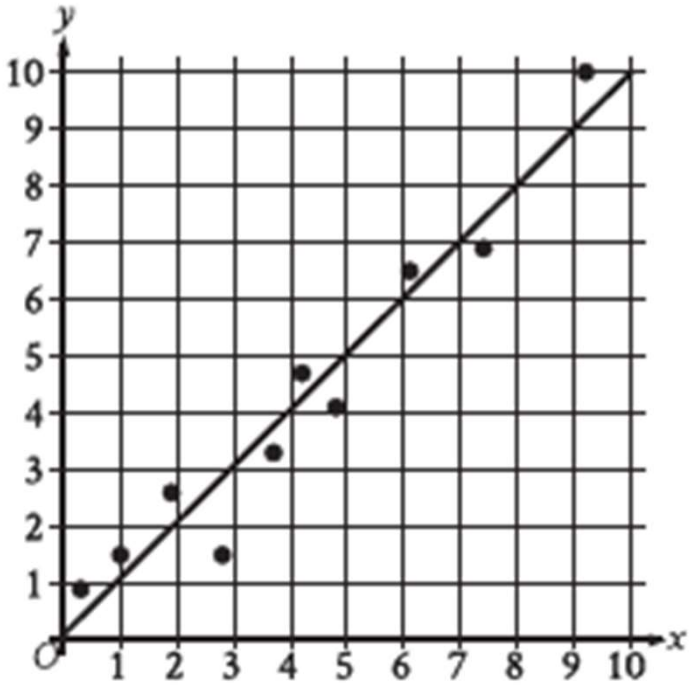
Question 17

The scatterplot shows the relationship between two variables x and y. *t* line of best fit for the data is also shown. For how many of the 10 data points is the actual x-value greater than the y-value predicted by the line of best fit?



A) 3

B) 4

C) 6

D) 7

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Question 17 Solution

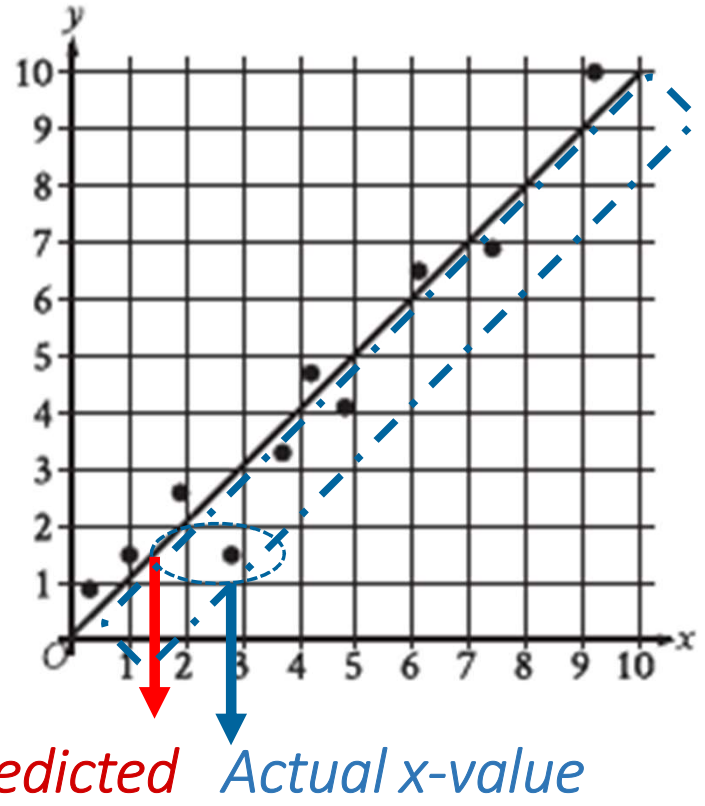
The scatterplot shows the relationship between two variables x and y. *t* line of best fit for the data is also shown. For how many of the 10 data points is the actual x-value greater than the y-value predicted by the line of best fit?

A) 3

B) 4 ✓

C) 6

D) 7



Question 18

What is the slope of the graph of

$y = \frac{1}{4}(22x + 7) + 5x$ in the xy-plane?

Question 18 Solution

What is the slope of the graph of

$y = \frac{1}{4}(22x + 7) + 5x$ in the xy-plane?

y=mx+b ⟹ *m* is the slope, (0,b) is y-intercept.

$y = \frac{22}{4}x + \frac{7}{4} + 5x$

$y = (\frac{22}{4} + 5)x + \frac{7}{4}$

$y = \frac{42}{4}x + \frac{7}{4}$

Slope = $\frac{42}{4} = \frac{21}{2}$ ✓

Question 19

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* ?

Number of Cars	Maximum number of passengers and crew
3	174
5	284
10	559

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

Question 19 Solution

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* ?

Number of Cars		Maximum number of passengers and crew
3	(3,174)	174
5	(5,284)	284
10	(10,559)	559

A) $55c - p = -9$ ✓
B) $55c - p = 9$
C) $55p - c = -9$
D) $55p - c = 9$

y=mx+b ⇒ *m* is the slope, (0,b) is y-intercept.

p=mc+b

$$\text{slope}=m=\frac{284-174}{5-3}=\frac{110}{2}=55$$

p=55c+b=174=55(3)+b

174=165+b → b=9

p=55c+9

Question 1

The function f is defined by the equation f(x) = 6x + 3

What is the value of f x( ) when x = 7 ?

Question 1 Solution

The function f is defined by the equation f(x) = 6x + 3

What is the value of f (x) when x = 7 ?

$f(x) = 6x + 3$

$f(7) = 6(7) + 3 = 42 + 3 = 45$ ✓

Question 2

An athlete runs at an average rate of 3.7 minutes per mile. Which function m models the number of minutes it will take the athlete to run x miles at this rate?

A) $m(x) = \frac{x}{3.7}$

B) $m(x) = x + 3.7$

C) $m(x) = x - 3.7$

D) $m(x) = 3.7x$

Question 2 Solution

An athlete runs at an average rate of 3.7 minutes per mile. Which function m models the number of minutes it will take the athlete to run x miles at this rate?

A) $m(x) = \frac{x}{3.7}$

B) $m(x) = x + 3.7$

C) $m(x) = x - 3.7$

D) $m(x) = 3.7x$ ✓

Number of minutes = 3.7(x)

m(x) = 3.7x

Question 3

The function f is defined by $f(x) = \frac{1}{8}x - 3$. What is the y-intercept of the graph of $y = f(x)$ in the xy-plane?

A) (-3, 0)

B) (0, -3)

C) $(0, \frac{1}{8})$

D) $(\frac{1}{8}, 0)$

Question 3 Solution

The function f is defined by $f(x) = \frac{1}{8}x - 3$. What is the y-intercept of the graph of y = f(x) in the xy-plane?

A) (-3, 0)

B) (0, -3) ✓

C) $(0, \frac{1}{8})$

D) $(\frac{1}{8}, 0)$

$y = \frac{1}{8}x - 3$ (0, -3) is y-intercept.

y=mx+b ⟹ *m* is the slope, (0,b) is y-intercept.

Question 4

The total cost f(x), in dollars, to rent a car for 7 days from a particular rent-a-car office is given by f(x) = 7x + 250, where x is the daily payment, in dollars. What is the total cost to rent a car when the daily payment is $90?

A) $540

B) $630

C) $880

D) $1,130

Question 4 Solution

The total cost f(x), in dollars, to rent a car for 7 days from a particular rent-a-car office is given by f(x) = 7x + 250, where x is the daily payment, in dollars. What is the total cost to rent a car when the daily payment is $90?

A) $540
B) $630
C) $880 ✓
D) $1,130

Total Cost = f(x) = 7x + 250

Total Cost = f(x) = 7(90) + 250

Total Cost = f(x) = 630 + 250 = 880

Question 5

In the linear function f, $f(0) = 6$ and $f(1) = 8$. Which equation defines f?

A) $f(x) = 4x + 6$

B) $f(x) = 3x$

C) $f(x) = 2x + 4$

D) $f(x) = 2x + 6$

Question 5 Solution

In the linear function f, $f(0) = 6$ and $f(1) = 8$. Which equation defines f?

A) $f(x) = 4x + 6$

B) $f(x) = 3x$

C) $f(x) = 2x + 4$

D) $f(x) = 2x + 6$ ✓

$y=mx+b$ ⟹ m is the slope, $(0,b)$ is y-intercept.

$f(0) = y = m(0)+b = 6 \rightarrow b = 6$

$f(1) = y = m(1)+6 = m + 6 = 8 \rightarrow m=2$

$f(x) = 2x + 6$

Question 6

The function h is defined by $h(x) = 3x + 18$. 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) 12

B) 15

C) 18

D) 24

Question 6 Solution

The function h is defined by $h(x) = 3x + 18$. 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) 12 ✓

B) 15

C) 18

D) 24

y=mx+b → *m* is the slope, (0,b) is y-intercept.

y=3x+18 (0, 18) is y-intercept. b=18

a=-6

0=3x+18 -18=3x -6=x (-6, 0) is x-intercept.

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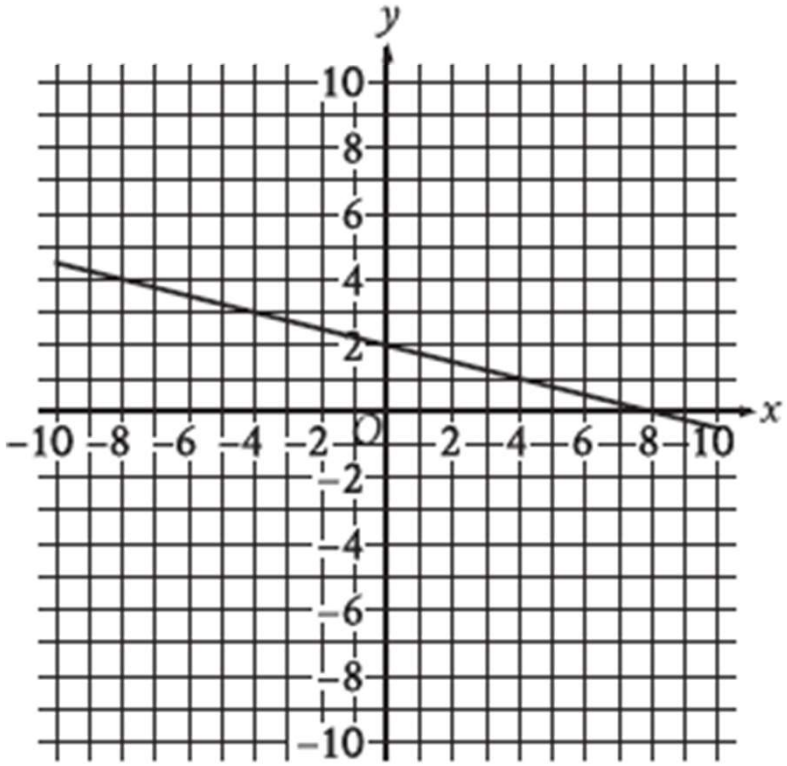
Question 7



The graph of $y = f(x) + 14$ is shown. Which equation defines function f?

A) $f(x) = -\frac{1}{4}x - 12$

B) $f(x) = -\frac{1}{4}x + 16$

C) $f(x) = -\frac{1}{4}x + 2$

D) $f(x) = -\frac{1}{4}x - 14$

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Question 7 Solution

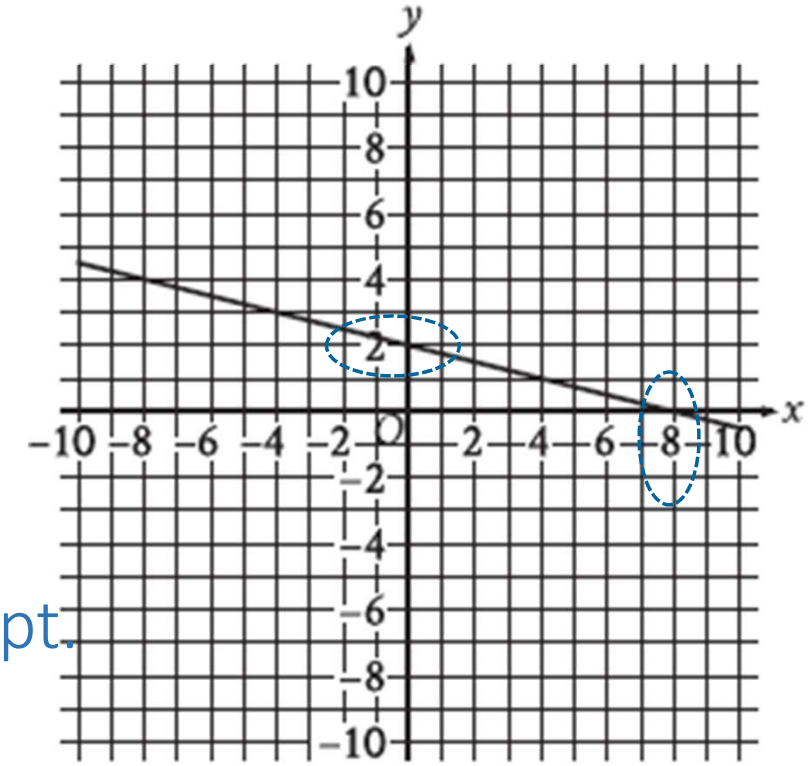
The graph of $y = f(x) + 14$ is shown. Which equation defines function f?

A) $f(x) = -\frac{1}{4}x - 12$ ✓

B) $f(x) = -\frac{1}{4}x + 16$

C) $f(x) = -\frac{1}{4}x + 2$

D) $f(x) = -\frac{1}{4}x - 14$



$y=mx+b$ ⇒ m is the slope, $(0,b)$ is y-intercept.

$0=m(8)+2$

$-2 = 8m$

$-\frac{1}{4} = m$

$y= -\frac{1}{4}x+2$

$y=f(x) + 14$

$f(x) = -\frac{1}{4}x+2 -14 = -\frac{1}{4}x - 12$

$f(x) = y -14$

Question 8

$h(m) = -0.04m + 10.7$

The given function *h* 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) 0.04

B) 10.7

C) 15

D) 267.5

Question 8 Solution

$h(m) = -0.04m + 10.7$

The given function h 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) 0.04 ✓

B) 10.7

C) 15

D) 267.5

$h(m) = -0.04m + 10.7$

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Question 9

x	f(x)
0	27
1	30
2	33

For the linear function *f*, the table shows three values of x and their corresponding values of *f*(x). Which equation defines *f*(x) ?

A) $f(x) = 3x + 27$

B) $f(x) = 27x + 30$

C) $f(x) = 33x + 27$

D) $f(x) = 30x + 33$

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Question 9 Solution

For the linear function *f*, the table shows three values of x and their corresponding values of *f*(x). Which equation defines *f*(x) ?

x	f(x)
0	27
1	30
2	33

A) $f(x) = 3x + 27$ ✓

~~*B)* $f(x) = 27x + 30$~~

C) $f(x) = 33x + 27$

~~D)* $f(x) = 30x + 33$~~

$30=m(1)x+27$

$m=3$

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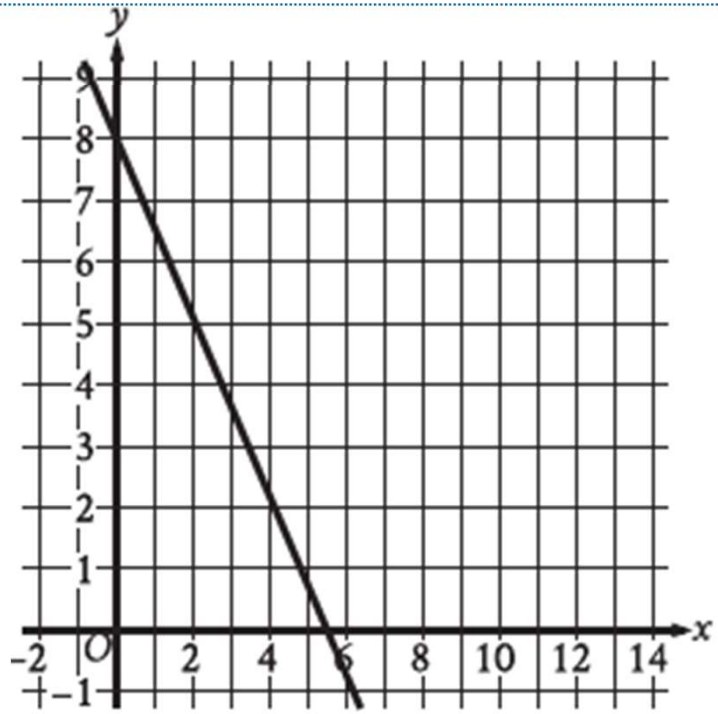
Question 10

The graph of the linear function *f* is shown, where *y = f(x)*. What is the y-intercept of the graph of *f* ?



A) (0, 0)

B) $(0, -\frac{16}{11})$

C) (0, -8)

D) (0, 8)

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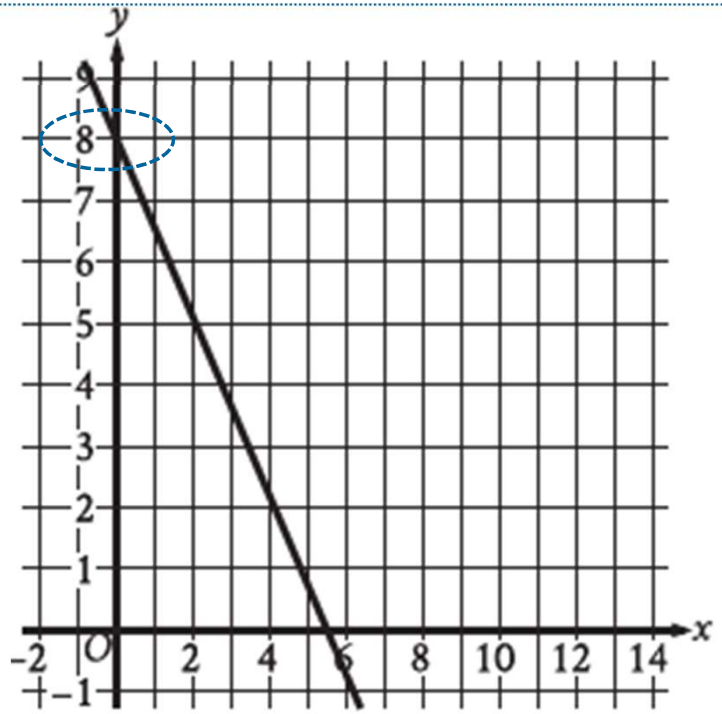
Question 10 Solution

The graph of the linear function *f* is shown, where *y* = *f*(*x*). What is the y-intercept of the graph of *f* ?



A) (0, 0)

B) $(0, -\frac{16}{11})$

C) (0, -8)

D) (0, 8) ✓

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Question 11

The table shows selected values from function *h*. Which of the following is the best description of function *h*?

x	*h*(x)
-1	11
0	10
1	9
2	8

A) Decreasing linear

B) Increasing linear

C) Decreasing exponential

D) Increasing exponential

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Question 11 Solution

The table shows selected values from function *h*. Which of the following is the best description of function *h*?

x	*h*(x)
-1	11
0	10
1	9
2	8

A) Decreasing linear ✓

B) Increasing linear

C) Decreasing exponential

D) Increasing exponential

A function with a constant rate of change is “linear”.

Question 12

The function g is defined by $g(x)=(x+12)(t-x)$, where t is a constant. In the xy-plane, the graph of $y = g(x)$passes through the point (20,0). What is the value of g(0)?

Question 12 Solution

The function *g* is defined by $g(x)=(x+12)(t-x)$, where t is a constant. In the xy-plane, the graph of $y = g(x)$passes through the point (20,0). What is the value of g(0)?

$0 = (20+12)(t-20)$

$t = 20$

$g(0) = (0+12)(20-0)$

$g(0) = 240$ ✓

Question 13

The function f is defined by $f(x) = \frac{7}{3x+6}$

What is the value of $f(3)$?

Question 13 Solution

The function f is defined by $f(x) = \frac{7}{3x+6}$

What is the value of $f(3)$?

$$f(3) = \frac{7}{3(3)+6} = \frac{7}{9+6}$$

$$f(3) = \frac{7}{15} \checkmark$$

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Question 14

x	$g(x)$
-27	3
-9	0
21	5

The table shows three values of x and their corresponding values of $g(x)$, where $g(x) = \frac{f(x)}{x+3}$ and f is a linear function. What is the y-intercept of the graph of $y = f(x)$ in the xy-plane.

A) (0, 36)

B) (0, 12)

C) (0, 4)

D) (0, -9)

Question 14 Solution

x	$g(x)$
-27	3
-9	0
21	5

The table shows three values of x and their corresponding values of $g(x)$, where $g(x) = \frac{f(x)}{x+3}$ and f is a linear function. What is the y-intercept of the graph of $y = f(x)$ in the xy-plane.

A) (0, 36) ✓
B) (0, 12)
C) (0, 4)
D) (0, -9)

y=mx+b ⟹ *m* is the slope, (0,b) is y-intercept.

$3=\frac{f(-27)}{-27+3}=\frac{f(-27)}{-24}$

f(-27) = -72

$m=\frac{0-(-72)}{-9-(-27)}=\frac{72}{18}$

$0=\frac{f(-9)}{-9+3}=\frac{f(-9)}{-6}$

f(-9) = 0

m=4

0=4(-9) + b

b=36

y=4x+36

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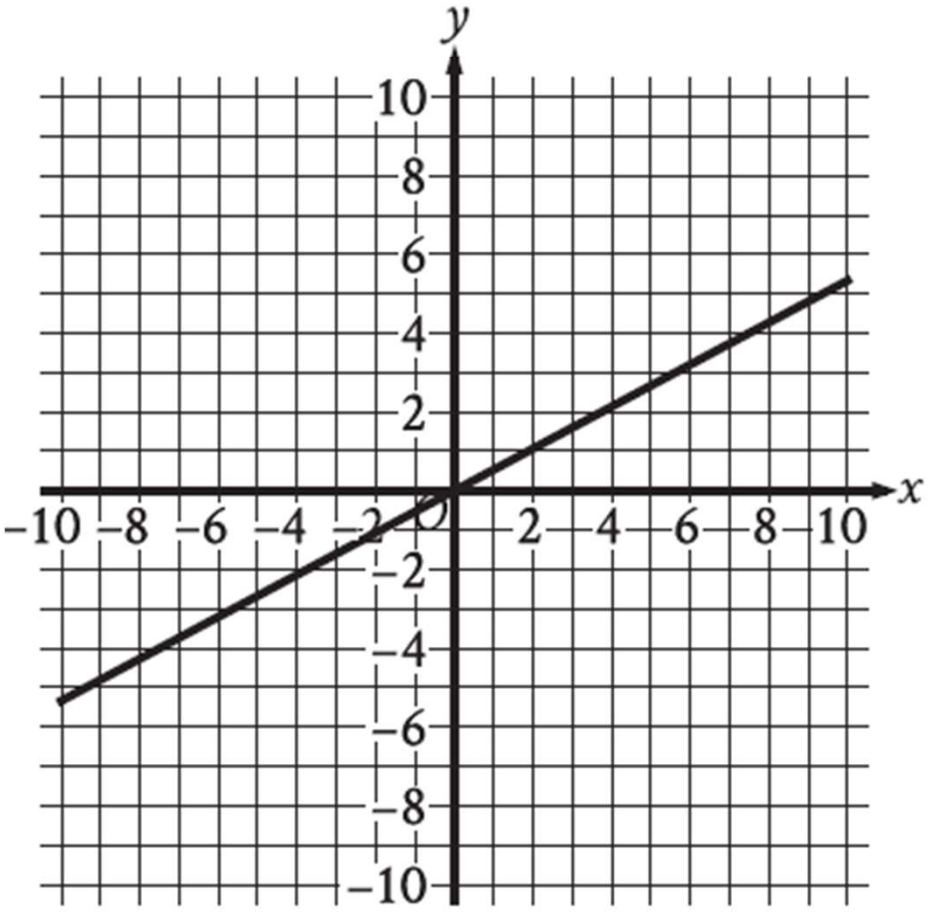
Question 15

The graph of function f is shown, where $y = f(x)$.



Which of the following describes function f ?

A) Increasing linear
B) Decreasing linear
C) Increasing exponential
D) Decreasing exponential

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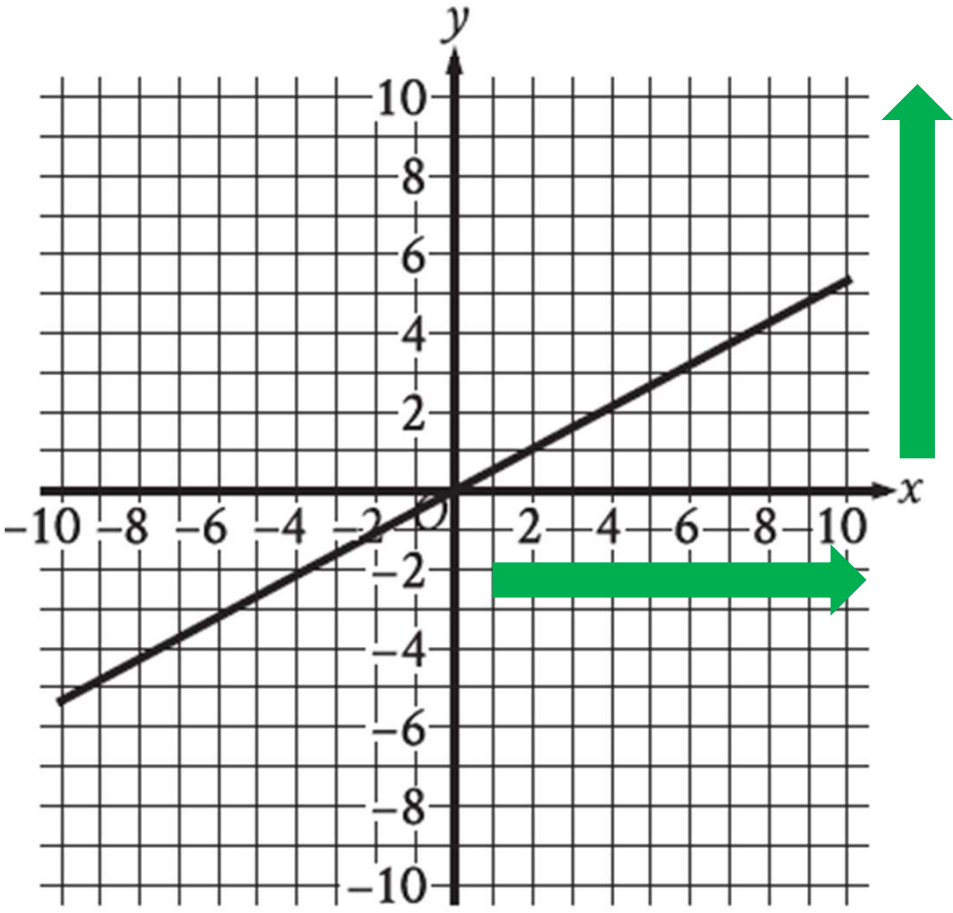
Question 15 Solution

The graph of function f is shown, where $y = f(x)$.



Which of the following describes function f ?

A) Increasing linear ✓
B) Decreasing linear
C) Increasing exponential
D) Decreasing exponential

A function with a constant rate of change is “linear”.

Question 16

The function f defined by $f(m)=11m + 7$ gives the estimated length, in inches, of a tree m months after Jane purchased it. Which of the following is the best interpretation of 7 in this context?

A) Ryan will keep the three for 7 months.
B) The tree is expected to grow 7 inches each month.
C) The tree is expected to grow to a maximum length of 7 inches.
D) The estimated length of the tree was 7 inches when Ryan purchased it.

Question 16 Solution

The function f defined by $f(m)$=11m + 7 gives the estimated length, in inches, of a tree *m* months after Jane purchased it. Which of the following is the best interpretation of 7 in this context?

A) Ryan will keep the three for 7 months.
B) The tree is expected to grow 7 inches each month.
C) The tree is expected to grow to a maximum length of 7 inches.
D) The estimated length of the tree was 7 inches when Ryan purchased it. ✓

$f(m) = 11m + 7$ $f(0) = 11(0) + 7 = 7$

Question 1

$y = -2x$

$3x + y = 11$

The solution to the given system of equations is (x, y). What is the value of x ?

A) 1
B) 5
C) 11
D) 33

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Question 1 Solution

$y = -2x$

$3x + y = 11$

The solution to the given system of equations is (x, y). What is the value of x ?

A) 1

B) 5

C) 11 ✓

D) 33

$3x + (-2x) = 11$

$3x - 2x = x = 11$

Question 2

2x + 3y = 7

10x + 15y = 35

For each real number r, which of the following points lies on the graph of each equation in the xy-plane for the given system?

A) $\left(\frac{r}{5} + 7 , -\frac{r}{5} + 35\right)$

B) $\left(-\frac{3r}{2} + \frac{7}{2} , r\right)$

C) $\left(r, \frac{2r}{3} + \frac{7}{3}\right)$

D) $\left(r, -\frac{3r}{2} + \frac{7}{2}\right)$

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Question 2 Solution.

$2x + 3y = 7$

$10x + 15y = 35$

For each real number r, which of the following points lies on the graph of each equation in the xy-plane for the given system?

A) $(\frac{r}{5} + 7 , -\frac{r}{5} + 35)$

B) $(-\frac{3r}{2} + \frac{7}{2} , r)$ ✓

C) $(r, \frac{2r}{3} + \frac{7}{3})$

D) $(r, -\frac{3r}{2} + \frac{7}{2})$

$5(2x + 3y) = (5)7$

$10x + 15y = 35$

$2x + 3(r) = 7$

$2x = 7 - 3r$

$x = \frac{7}{2} - \frac{3r}{2}$ $\qquad$ $(\frac{7}{2} - \frac{3r}{2} , r)$

Question 3

$x + 5 = 11$

$(x + 5)^2 = y$

Which ordered pair (x, y) is a solution to the given system of equations?

A) (6, 121)
B) (6, 6)
C) (6, 11)
D) (6, 66)

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Question 3 Solution

$X + 5 = 11$

$(x + 5)^2 = y$

Which ordered pair (x, y) is a solution to the given system of equations?

A) (6, 121) ✓
B) (6, 6)
C) (6, 11)
D) (6, 66)

$x + 5 - 5 = 11 - 5 \rightarrow x = 6$

$(6 + 5)^2 = (11)^2 = y \rightarrow y = 121$

Algebra Domain

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Question 4

5x + 7y = 1

ax + by = 1

In the given pair of equations, a and b are constants. The graph of this pair of equations in the xy-plane is a pair of perpendicular lines. Which of the following pairs of equations also represents a pair of perpendicular lines?

A) 10x + 7y =1
ax – 2by = 1

B) 10x + 7y = 1
ax + 2by =1

C) 10x + 7y = 1
2ax + by =1

D) 5x – 7y = 1
ax + by =1

Algebra Domain

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Question 4 Solution

5x + 7y = 1

ax + by = 1

In the given pair of equations, a and b are constants. The graph of this pair of equations in the xy-plane is a pair of perpendicular lines. Which of the following pairs of equations also represents a pair of perpendicular lines?

two lines are perpendicular if their slopes are negative reciprocals.

y=mx+b → *m* is the slope, (0,b) is y-intercept.

A) 10x + 7y =1
ax – 2by = 1

B) 10x + 7y = 1
ax + 2by =1

C) 10x + 7y = 1
2ax + by =1

D) 5x – 7y = 1
ax + by =1

$5x + 7y - 5x = 1 - 5x$

$y = -\frac{5}{7}x + \frac{1}{7}$

$m = -\frac{5}{7}$

Slope of 2nd line = $\frac{-1}{(-5/7)} = \frac{7}{5}$

$by = 1 - ax$

$y = -\frac{a}{b}x + \frac{1}{b}$

$\frac{a}{b} = -\frac{7}{5}$

$y = -\frac{10}{7}x + \frac{1}{7}$ $\quad y = -\frac{a}{2b}x + \frac{1}{2b}$ → $m = -\left(-\frac{7}{(2)5}\right) = \frac{7}{10}$

Question 5

$7x = 21$

$-6x + y = -4$

The solution to the given system of equations is (x, y). What is the value of x + y ?

A) -25
B) -17
C) 17
D) 25

Question 5 Solution

$7x = 21$

$-6x + y = -4$

The solution to the given system of equations is (x, y). What is the value of x + y ?

A) -25
B) -17
C) 17 ✓
D) 25

$7x - 6x + y = 21 - 4$

$x + y = 17$

Question 6

$y = 3x + 1$

$4y = 11x - 8$

The solution to the given system of equations is (x, y). What is the value of x - y ?

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Question 6 Solution

y = 3x + 1

4y = 11x - 8

The solution to the given system of equations is (x, y). What is the value of x - y ?

$4(3x+1) = 11x - 8$

$12x + 4 = 11x - 8$

$12x + 4 - 11x - 4 = 11x - 8 - 11x - 4$

$x = -12$

$y = 3(-12)+1$

$y = -35$

$x - y = -12 - (-35) = 23$ ✓

Question 7

$8x + 9y = 37$

$2x + 2y = 11$

The solution to the given system of equations is (x, y). What is the value of y ?

A) -7
B) 7
C) 18
D) 26

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Question 7 Solution

$8x + 9y = 37$

$2x + 2y = 11$

The solution to the given system of equations is (x, y). What is the value of y ?

A) -7 ✓

B) 7

C) 18

D) 26

$4(2x + 2y) = 11(4)$

$8x + 8y = 44$

$8x + 9y - (8x + 8y) = 37 - 44$

$y = -7$

Question 8

$$\frac{3}{2}y - \frac{1}{4}x = \frac{2}{3} - \frac{3}{2}y$$

$$\frac{1}{2}x + \frac{3}{2} = py + \frac{9}{2}$$

In the given system of equations, p is a constant. If the system has no solution, what is the value of p ?

Question 8 Solution

x and y has no solution if the lines are parallel and distinct.

Ax + By = C and Dx + Ey = F are parallel and distinct

$\frac{3}{2}y - \frac{1}{4}x = \frac{2}{3} - \frac{3}{2}y$

$\frac{1}{2}x + \frac{3}{2} = py + \frac{9}{2}$

If → $\frac{D}{A} = \frac{E}{B}$ and $\frac{F}{C}$ is not equal to $\frac{D}{A}$ or $\frac{E}{B}$

In the given system of equations, p is a constant. If the system has no solution, what is the value of p ?

18y – 3x = 8 – 18y

36y – 3x = 8

x + 3 = 2py + 9

-2py + x = 6

$\frac{36}{-2p} = \frac{-3}{1}$ $\quad \frac{8}{6} \neq \frac{-3}{1}$ $\quad \frac{36(-2p)}{-2p} = \frac{-3(-2p)}{1}$

p = 6 ✓

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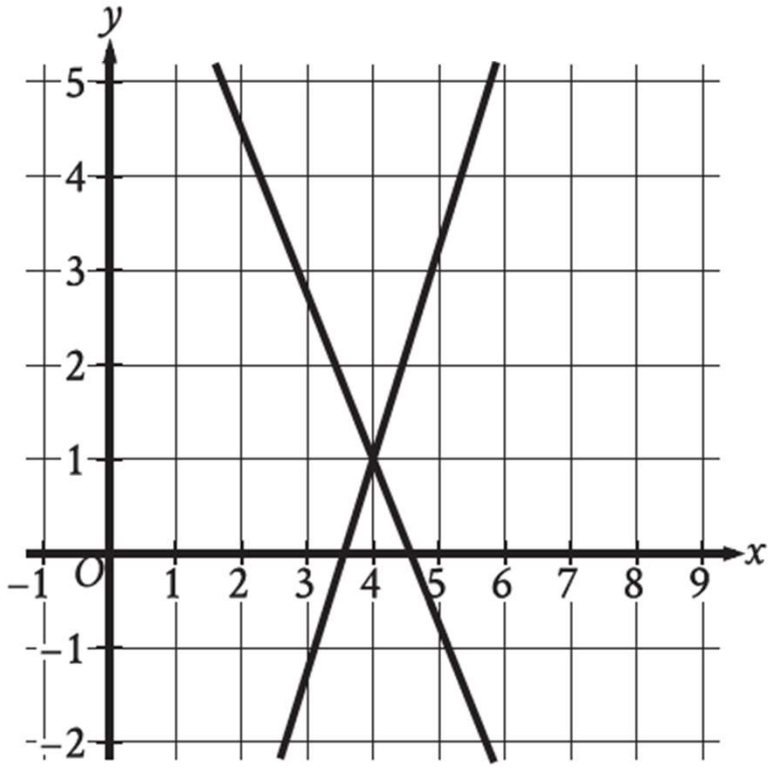
Question 9

The graph of a system of linear equations is shown. The solution to the system is (x,y). What is the value of x+y ?



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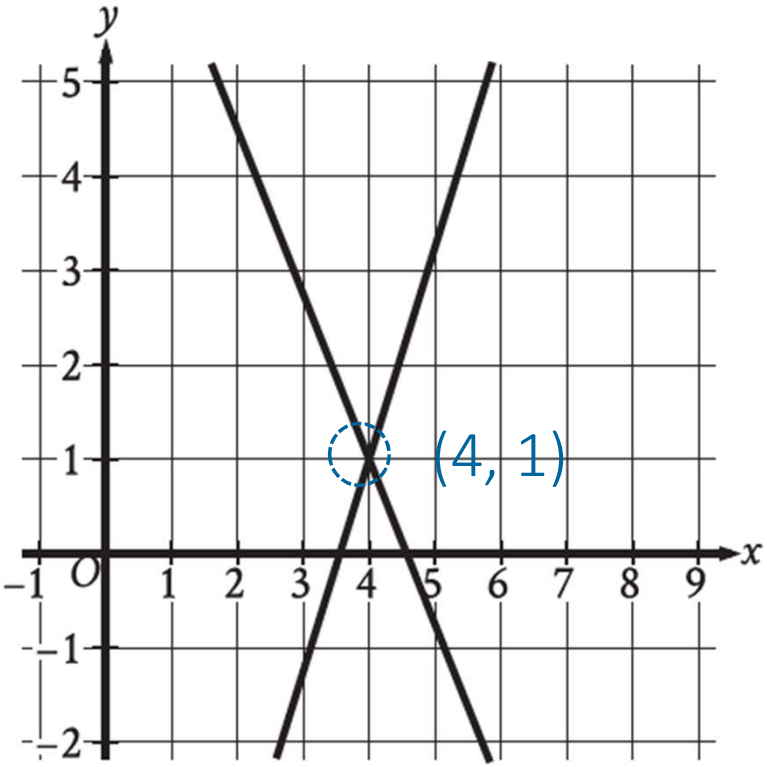
Question 9 Solution

The graph of a system of linear equations is shown. The solution to the system is (x,y). What is the value of x+y ?



A solution to a system of equations must satisfy each equation in the system.

$x + y = 4 + 1 = 5$ ✓

Question 1

The total cost, in dollars, to rent a bike consists of a $15 service fee and a $10 per hour rental fee. A person rents a bike for *t* hours and intends to spend a maximum of $65 to rent the bike. Which inequality represents this situation?

A) $10t \leq 65$
B) $15 + 10t \leq 65$
C) $15t \leq 65$
D) $10 + 15t \leq 65$

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Question 1 Solution

The total cost, in dollars, to rent a bike consists of a $15 service fee and a $10 per hour rental fee. A person rents a bike for *t* hours and intends to spend a maximum of $65 to rent the bike. Which inequality represents this situation?

A) $10t \leq 65$

B) $15 + 10t \leq 65$ ✓

C) $15t \leq 65$

D) $10 + 15t \leq 65$

Service fee = $15

Rental fee= 10t

Total fee= 15 + 10t

Total fee= $15 + 10t \leq 65$

Question 2

$y > 19$

$3x + y < 13$

The point (x, 23) is a solution to the system of inequalities in the xy-plane. Which of the following could be the value of x ?

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

Question 2 Solution

$y > 19$

$3x + y < 13$

The point (x, 23) is a solution to the system of inequalities in the xy-plane. Which of the following could be the value of x ?

A) -4 ✓

B) -3

C) 3

D) 4

$y > 19$ $\quad 23 > 19 \rightarrow$ True

$3x + 23 < 13$

$3x + 23 - 23 < 13 - 23 \rightarrow 3x < -10$

$x < -3.333$

Question 3

$y \leq x + 7$

$y \geq -2x - 1$

Which point (x,y) is a solution to the given system of inequalities in the xy-plane?

A) (-14, 0)
B) (0, -14)
C) (0, 14)
D) (14, 0)

Question 3 Solution

$y \leq x + 7$

$y \geq -2x - 1$

Multiplying both sides of an inequality by a negative number changes the direction of the inequality sign.

Which point (x,y) is a solution to the given system of inequalities in the xy-plane?

~~A) (-14, 0)~~

~~B) (0, -14)~~

~~C) (0, 14)~~

D) (14, 0) ✓

$(-1)\ y \geq (-1)(x+7)$ $\quad -y \geq -x - 7$

$y - y \geq -2x - 1 - x - 7$

$0 \geq -3x - 8 \quad x \geq \frac{-8}{3} \rightarrow x \geq -2.67$

$-14 \leq 0 + 7 \rightarrow 14 \leq 7$ True

$-14 \geq -2(0)-1 \rightarrow -14 \geq -1$ False

$14 \leq 0 + 7 \rightarrow 14 \leq 7$ False

$14 \geq -2(0)-1 \rightarrow 14 \geq -1$ True

$0 \leq 14 + 7 \rightarrow 0 \leq 21$ True

$0 \geq -2(14)-1 \rightarrow 0 \geq -29$ True

Question 4

The minimum value of *x* is 13 less than 7 times another number *k*. Which inequality shows the possible values of x ?

A) $x \leq 7k - 13$
B) $x \geq 7k - 13$
C) $x \leq 13 - 7k$
D) $x \geq 13 - 6k$

Question 4 Solution

The minimum value of *x* is 13 less than 7 times another number *k*. Which inequality shows the possible values of x ?

A) $x \leq 7k - 13$
B) $x \geq 7k - 13$ ✓
C) $x \leq 13 - 7k$
D) $x \geq 13 - 6k$

13 less than 7 times another number $k = 7k - 13$

$x \geq 7k - 13$

Question 5

For a snowstorm in a certain town, the minimum rate of snowfall recorded was 0.5 inches per hour, and the maximum rate of snowfall recorded was 1.7 inches per hour. Which inequality is true for all values of s, where s represents a rate of snowfall, in inches per hour, recorded for this snowstorm?

A) $s \leq 2.2$

B) $s \geq 1.7$

C) $0 \leq s \leq 0.5$

D) $0.5 \leq s \leq 1.7$

Question 5 Solution

For a snowstorm in a certain town, the minimum rate of snowfall recorded was 0.5 inches per hour, and the maximum rate of snowfall recorded was 1.7 inches per hour. Which inequality is true for all values of *s*, where *s* represents a rate of snowfall, in inches per hour, recorded for this snowstorm?

A) $s \leq 2.2$ $s \geq 0.5$

B) $s \geq 1.7$ $s \leq 1.7$

C) $0 \leq s \leq 0.5$

D) $0.5 \leq s \leq 1.7$ ✓

San Francisco Business School

Question 6

$2x - y > 883$

For which of the following tables are all the values of *x* and their corresponding values of *y* solutions to the given inequality?

A)

x	y
440	0
441	-2
442	-4

B)

x	y
440	0
442	-2
441	-4

C)

x	y
442	0
442	-2
441	-4

D)

x	y
442	0
441	-2
440	-4

Question 6 Solution

$2x - y > 883$

For which of the following tables are all the values of *x* and their corresponding values of *y* solutions to the given inequality?

A)

x	y
440	0
441	-2
442	-4

$2(440) - 0 > 883$

$880 > 883$ False

B)

x	y
440	0
442	-2
441	-4

C)

x	y
442	0
440	-2
441	-4

$2(442) - 0 > 883$

$884 > 883$

$2(440) - (-2) > 883$

$882 > 883$ False

D) ✓

x	y
442	0
441	-2
440	-4

Row 1 → $884 > 883$

Row 2 → $884 > 883$

Row 3 → $884 > 883$