

Question ID 2eb1f9e1

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: 2eb1f9e1

A line in the xy -plane has a slope of 9 and passes through the point $(0, -5)$. The equation $y = px + r$ defines the line, where p and r are constants. What is the value of p ?

ID: 2eb1f9e1 Answer

Correct Answer: 9

Rationale

The correct answer is 9. It's given that the equation $y = px + r$ defines the line. In this equation, p represents the slope of the line and r represents the y -coordinate of the y -intercept of the line. It's given that the line has a slope of 9. Therefore, the value of p is 9.

Question Difficulty: Medium

Question ID 80f346ea

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: 80f346ea

A line passes through the points $(4, 6)$ and $(15, 24)$ in the xy -plane. What is the slope of the line?

ID: 80f346ea Answer

Correct Answer: 1.636, 18/11

Rationale

The correct answer is $\frac{18}{11}$. For a line that passes through the points (x_1, y_1) and (x_2, y_2) in the xy -plane, the slope of the line can be calculated using the slope formula, $m = \frac{y_2 - y_1}{x_2 - x_1}$. It's given that a line passes through the points $(4, 6)$ and $(15, 24)$ in the xy -plane. Substituting $(4, 6)$ for (x_1, y_1) and $(15, 24)$ for (x_2, y_2) in the slope formula, $m = \frac{y_2 - y_1}{x_2 - x_1}$, yields $m = \frac{24 - 6}{15 - 4}$, or $m = \frac{18}{11}$. Therefore, the slope of the line is $\frac{18}{11}$. Note that $18/11$ and 1.636 are examples of ways to enter a correct answer.

Question Difficulty: Medium

Question ID 38f53fa4

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: 38f53fa4

Figure A and figure B are both regular polygons. The sum of the perimeter of figure A and the perimeter of figure B is **63** inches. The equation $3x + 6y = 63$ represents this situation, where x is the number of sides of figure A and y is the number of sides of figure B. Which statement is the best interpretation of **6** in this context?

- A. Each side of figure B has a length of **6** inches.
- B. The number of sides of figure B is **6**.
- C. Each side of figure A has a length of **6** inches.
- D. The number of sides of figure A is **6**.

ID: 38f53fa4 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that figure A and figure B (not shown) are both regular polygons and the sum of the perimeters of the two figures is **63 inches**. It's also given that x is the number of sides of figure A and y is the number of sides of figure B, and that the equation $3x + 6y = 63$ represents this situation. Thus, $3x$ and $6y$ represent the perimeters, in inches, of figure A and figure B, respectively. Since $6y$ represents the perimeter, in inches, of figure B and y is the number of sides of figure B, it follows that each side of figure B has a length of **6 inches**.

Choice B is incorrect. The number of sides of figure B is y , not **6**.

Choice C is incorrect. Since the perimeter, in inches, of figure A is represented by $3x$, each side of figure A has a length of **3 inches**, not **6 inches**.

Choice D is incorrect. The number of sides of figure A is x , not **6**.

Question Difficulty: Medium

Question ID a39e1c3b

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: a39e1c3b

What is the slope of the graph of $y = \frac{1}{4}(27x + 15) + 7x$ in the xy -plane?

ID: a39e1c3b Answer

Correct Answer: 13.75, 55/4

Rationale

The correct answer is $\frac{55}{4}$. In the xy -plane, the graph of an equation in the form $y = mx + b$, where m and b are constants, has a slope of m and a y -intercept of $(0, b)$. Applying the distributive property to the right-hand side of the given equation yields $y = \frac{27}{4}x + \frac{15}{4} + 7x$. Combining like terms yields $y = \frac{55}{4}x + \frac{15}{4}$. This equation is in the form $y = mx + b$, where $m = \frac{55}{4}$ and $b = \frac{15}{4}$. It follows that the slope of the graph of $y = \frac{1}{4}(27x + 15) + 7x$ in the xy -plane is $\frac{55}{4}$. Note that 55/4 and 13.75 are examples of ways to enter a correct answer.

Question Difficulty: Medium

Question ID d609d1ce

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: d609d1ce

Line k is defined by $y = -\frac{17}{3}x + 5$. Line j is perpendicular to line k in the xy -plane. What is the slope of line j ?

ID: d609d1ce Answer

Correct Answer: .1764, .1765, 3/17

Rationale

The correct answer is $\frac{3}{17}$. It's given that line j is perpendicular to line k in the xy -plane. This means that the slope of line j is the negative reciprocal of the slope of line k . The equation of line k , $y = -\frac{17}{3}x + 5$, is written in slope-intercept form $y = mx + b$, where m is the slope of the line and b is the y -coordinate of the y -intercept of the line. It follows that the slope of line k is $-\frac{17}{3}$. The negative reciprocal of a number is -1 divided by the number. Therefore, the negative reciprocal of $-\frac{17}{3}$ is $-\frac{1}{17}$, or $\frac{3}{17}$. Thus, the slope of line j is $\frac{3}{17}$. Note that $3/17$, $.1764$, $.1765$, and 0.176 are examples of ways to enter a correct answer.

Question Difficulty: Medium

Question ID ac7cddee

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: ac7cddee

When line n is graphed in the xy -plane, it has an x -intercept of $(-4, 0)$ and a y -intercept of $(0, \frac{86}{3})$. What is the slope of line n ?

- A. $\frac{3}{344}$
- B. $\frac{6}{43}$
- C. $\frac{43}{6}$
- D. $\frac{344}{3}$

ID: ac7cddee Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that when line n is graphed in the xy -plane, it has an x -intercept of $(-4, 0)$ and a y -intercept of $(0, \frac{86}{3})$. The slope, m , of a line can be found using any two points on the line, (x_1, y_1) and (x_2, y_2) , and the slope formula $m = \frac{y_2 - y_1}{x_2 - x_1}$. Substituting the points $(-4, 0)$ and $(0, \frac{86}{3})$ for (x_1, y_1) and (x_2, y_2) , respectively, in the slope formula yields $m = \frac{\frac{86}{3} - 0}{0 - (-4)}$, or $m = \frac{43}{6}$. Therefore, the slope of line n is $\frac{43}{6}$.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect. This is the slope of a line that has an x -intercept of $(\frac{86}{3}, 0)$ and a y -intercept of $(0, -4)$.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID e2b60318

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: e2b60318

Line p is defined by $2y + 18x = 9$. Line r is perpendicular to line p in the xy -plane. What is the slope of line r ?

- A. -9
- B. $-\frac{1}{9}$
- C. $\frac{1}{9}$
- D. 9

ID: e2b60318 Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that line r is perpendicular to line p in the xy -plane. This means that the slope of line r is the negative reciprocal of the slope of line p . If the equation for line p is rewritten in slope-intercept form $y = mx + b$, where m and b are constants, then m is the slope of the line and $(0, b)$ is its y -intercept. Subtracting $18x$ from both sides of the equation $2y + 18x = 9$ yields $2y = -18x + 9$. Dividing both sides of this equation by 2 yields $y = -9x + \frac{9}{2}$. It follows that the slope of line p is -9 . The negative reciprocal of a number is -1 divided by the number. Therefore, the negative reciprocal of -9 is $\frac{-1}{9}$, or $\frac{1}{9}$. Thus, the slope of line r is $\frac{1}{9}$.

Choice A is incorrect. This is the slope of line p , not line r .

Choice B is incorrect. This is the reciprocal, not the negative reciprocal, of the slope of line p .

Choice D is incorrect. This is the negative, not the negative reciprocal, of the slope of line p .

Question Difficulty: Medium

Question ID 28c92268

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: 28c92268

A total of **2** squares each have side length r . A total of **6** equilateral triangles each have side length t . None of these squares and triangles shares a side. The sum of the perimeters of all these squares and triangles is **210**. Which equation represents this situation?

- A. $6r + 24t = 210$
- B. $2r + 6t = 210$
- C. $8r + 18t = 210$
- D. $6r + 2t = 210$

ID: 28c92268 Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that a total of **2** squares each have side length r . Therefore, each of the squares has perimeter $4r$. Since there are a total of **2** squares, the sum of the perimeters of these squares is $4r + 4r$, which is equivalent to $2(4r)$, or $8r$. It's also given that a total of **6** equilateral triangles each have side length t . Therefore, each of the equilateral triangles has perimeter $3t$. Since there are a total of **6** equilateral triangles, the sum of the perimeters of these triangles is $3t + 3t + 3t + 3t + 3t + 3t$, which is equivalent to $6(3t)$, or $18t$. Since the sum of the perimeters of the squares is $8r$ and the sum of the perimeters of the triangles is $18t$, the sum of the perimeters of all these squares and triangles is $8r + 18t$. It's given that the sum of the perimeters of all these squares and triangles is **210**. Therefore, the equation $8r + 18t = 210$ represents this situation.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID a2bf1dd6

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: a2bf1dd6

Line k is defined by $y = 7x + \frac{1}{8}$. Line j is perpendicular to line k in the xy -plane. What is the slope of line j ?

- A. -8
- B. $-\frac{1}{7}$
- C. $\frac{1}{8}$
- D. 7

ID: a2bf1dd6 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that line k is defined by $y = 7x + \frac{1}{8}$. For an equation in slope-intercept form $y = mx + b$, m represents the slope of the line defined by this equation in the xy -plane and b represents the y -coordinate of the y -intercept of this line. Therefore, the slope of line k is 7 . It's also given that line j is perpendicular to line k in the xy -plane. Therefore, the slope of line j is the opposite reciprocal of the slope of line k . The opposite reciprocal of 7 is $-\frac{1}{7}$. Therefore, the slope of line j is $-\frac{1}{7}$.

Choice A is incorrect. This is the opposite reciprocal of the y -coordinate of the y -intercept, not the slope, of line k .

Choice C is incorrect. This is the y -coordinate of the y -intercept of line k , not the slope of line j .

Choice D is incorrect. This is the slope of a line that is parallel, not perpendicular, to line k .

Question Difficulty: Medium

Question ID cd13910e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: cd13910e

What is the slope of the graph of $y = \frac{5x}{13} - 23$ in the xy -plane?

ID: cd13910e Answer

Correct Answer: .3846, 5/13

Rationale

The correct answer is $\frac{5}{13}$. The graph of a line in the xy -plane can be represented by the equation $y = mx + b$, where m is the slope of the line and b is the y -coordinate of the y -intercept. The given equation can be written as $y = (\frac{5}{13})x - 23$. Therefore, the slope of the graph of this equation in the xy -plane is $\frac{5}{13}$. Note that 5/13, .3846, 0.385, and 0.384 are examples of ways to enter a correct answer.

Question Difficulty: Medium

Question ID 0edb622e

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: 0edb622e

If the graph of $27x + 33y = 297$ is shifted down 5 units in the xy -plane, what is the y -intercept of the resulting graph?

- A. $(0, 4)$
- B. $(0, 6)$
- C. $(0, 14)$
- D. $(0, 28)$

ID: 0edb622e Answer

Correct Answer: A

Rationale

Choice A is correct. When the graph of an equation in the form $Ax + By = C$, where A , B , and C are constants, is shifted down k units in the xy -plane, the resulting graph can be represented by the equation $Ax + B(y + k) = C$. It's given that the graph of $27x + 33y = 297$ is shifted down 5 units in the xy -plane. Therefore, the resulting graph can be represented by the equation $27x + 33(y + 5) = 297$, or $27x + 33y + 165 = 297$. Subtracting 165 from both sides of this equation yields $27x + 33y = 132$. The y -intercept of the graph of an equation in the xy -plane is the point where the line intersects the y -axis, represented by the point $(0, y)$. Substituting 0 for x in the equation $27x + 33y = 132$ yields $27(0) + 33y = 132$, or $33y = 132$. Dividing both sides of this equation by 33 yields $y = 4$. Therefore, if the graph of $27x + 33y = 297$ is shifted down 5 units, the y -intercept of the resulting graph is $(0, 4)$.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect. This is the y -intercept of the graph of $27x + 33y = 297$ shifted up, not down, 5 units.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 3c65fb48

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: 3c65fb48

x	y
-6	$n + 184$
-3	$n + 92$
0	n

The table shows three values of x and their corresponding values of y , where n is a constant, for the linear relationship between x and y . What is the slope of the line that represents this relationship in the xy -plane?

- A. $-\frac{92}{3}$
- B. $-\frac{3}{92}$
- C. $\frac{n+92}{-3}$
- D. $\frac{2n-92}{3}$

ID: 3c65fb48 Answer

Correct Answer: A

Rationale

Choice A is correct. The slope, m , of a line in the xy -plane can be found using two points on the line, (x_1, y_1) and (x_2, y_2) , and the slope formula $m = \frac{y_2 - y_1}{x_2 - x_1}$. Based on the given table, the line representing the relationship between x and y in the xy -plane passes through the points $(-6, n + 184)$, $(-3, n + 92)$, and $(0, n)$, where n is a constant. Substituting two of these points, $(-3, n + 92)$ and $(0, n)$, for (x_1, y_1) and (x_2, y_2) , respectively, in the slope formula yields $m = \frac{n - (n + 92)}{0 - (-3)}$, which is equivalent to $m = \frac{n - n - 92}{0 + 3}$, or $m = -\frac{92}{3}$. Therefore, the slope of the line that represents this relationship in the xy -plane is $-\frac{92}{3}$.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID e0a370ba

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: e0a370ba

A neighborhood consists of a **2**-hectare park and a **35**-hectare residential area. The total number of trees in the neighborhood is **3,934**. The equation $2x + 35y = 3,934$ represents this situation. Which of the following is the best interpretation of x in this context?

- A. The average number of trees per hectare in the park
- B. The average number of trees per hectare in the residential area
- C. The total number of trees in the park
- D. The total number of trees in the residential area

ID: e0a370ba Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that a neighborhood consists of a **2**-hectare park and a **35**-hectare residential area and that the total number of trees in the neighborhood is **3,934**. It's also given that the equation $2x + 35y = 3,934$ represents this situation. Since the total number of trees for a given area can be determined by taking the number of hectares times the average number of trees per hectare, this must mean that the terms $2x$ and $35y$ correspond to the number of trees in the park and in the residential area, respectively. Since $2x$ corresponds to the number of trees in the park, and **2** is the size of the park, in hectares, x must represent the average number of trees per hectare in the park.

Choice B is incorrect and may result from conceptual errors.

Choice C is incorrect and may result from conceptual errors.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Medium

Question ID 0dac9e81

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: 0dac9e81

In the xy -plane, line k passes through the points $(0, -5)$ and $(1, -1)$. Which equation defines line k ?

- A. $y = -x + \frac{1}{4}$
- B. $y = \frac{1}{4}x - 5$
- C. $y = -x + 4$
- D. $y = 4x - 5$

ID: 0dac9e81 Answer

Correct Answer: D

Rationale

Choice D is correct. An equation defining a line in the xy -plane can be written in the form $y = mx + b$, where m represents the slope and $(0, b)$ represents the y -intercept of the line. It's given that line k passes through the point $(0, -5)$; therefore, $b = -5$. The slope, m , of a line can be found using any two points on the line, (x_1, y_1) and (x_2, y_2) , and the slope formula $m = \frac{y_2 - y_1}{x_2 - x_1}$. Substituting the points $(0, -5)$ and $(1, -1)$ for (x_1, y_1) and (x_2, y_2) , respectively, in the slope formula yields $m = \frac{(-1) - (-5)}{(1) - (0)}$, or $m = 4$. Substituting 4 for m and -5 for b in the equation $y = mx + b$ yields $y = 4x - 5$.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 1c769c42

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: 1c769c42

At a state fair, attendees can win tokens that are worth a different number of points depending on the shape. One attendee won S square tokens and C circle tokens worth a total of **1,120** points. The equation $80S + 90C = 1,120$ represents this situation. How many more points is a circle token worth than a square token?

- A. 950
- B. 90
- C. 80
- D. 10

ID: 1c769c42 Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that the equation $80S + 90C = 1,120$ represents this situation, where S is the number of square tokens won, C is the number of circle tokens won, and **1,120** is the total number of points the tokens are worth. It follows that $80S$ represents the total number of points the square tokens are worth. Therefore, each square token is worth **80** points. It also follows that $90C$ represents the total number of points the circle tokens are worth. Therefore, each circle token is worth **90** points. Since a circle token is worth **90** points and a square token is worth **80** points, then a circle token is worth **90 – 80**, or **10**, more points than a square token.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect. This is the number of points a circle token is worth.

Choice C is incorrect. This is the number of points a square token is worth.

Question Difficulty: Medium

Question ID 58c789fd

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: 58c789fd

In the xy -plane, line s passes through the point $(0, 0)$ and is parallel to the line represented by the equation $y = 18x + 2$. If line s also passes through the point $(4, d)$, what is the value of d ?

- A. 2
- B. 18
- C. 72
- D. 74

ID: 58c789fd Answer

Correct Answer: C

Rationale

Choice C is correct. A line in the xy -plane can be represented by an equation of the form $y = mx + b$, where m is the slope and b is the y -coordinate of the y -intercept of the line. It's given that line s passes through the point $(0, 0)$. Therefore, the y -coordinate of the y -intercept of line s is 0. It's also given that line s is parallel to the line represented by the equation $y = 18x + 2$. Since parallel lines have the same slope, it follows that the slope of line s is 18. Therefore, line s can be represented by the equation $y = mx + b$, where $m = 18$ and $b = 0$. Substituting 18 for m and 0 for b in $y = mx + b$ yields the equation $y = 18x + 0$, or $y = 18x$. If line s passes through the point $(4, d)$, then when $x = 4$, $y = d$ for the equation $y = 18x$. Substituting 4 for x and d for y in this equation yields $d = 18(4)$, or $d = 72$.

Choice A is incorrect. This is the y -coordinate of the y -intercept of the line represented by the equation $y = 18x + 2$.

Choice B is incorrect. This is the slope of the line represented by the equation $y = 18x + 2$.

Choice D is incorrect. The line represented by the equation $y = 18x + 2$, not line s , passes through the point $(4, 74)$.

Question Difficulty: Medium

Question ID 432f9706

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: 432f9706

A certain township consists of a **5**-hectare industrial park and a **24**-hectare neighborhood. The total number of trees in the township is **4,529**. The equation $5x + 24y = 4,529$ represents this situation. Which of the following is the best interpretation of x in this context?

- A. The average number of trees per hectare in the industrial park
- B. The average number of trees per hectare in the neighborhood
- C. The total number of trees in the industrial park
- D. The total number of trees in the neighborhood

ID: 432f9706 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that a certain township consists of a **5**-hectare industrial park and a **24**-hectare neighborhood and that the total number of trees in the township is **4,529**. It's also given that the equation $5x + 24y = 4,529$ represents this situation. Since the total number of trees for a given area can be determined by taking the size of the area, in hectares, times the average number of trees per hectare, the best interpretation of $5x$ is the number of trees in the industrial park and the best interpretation of $24y$ is the number of trees in the neighborhood. Since **5** is the size of the industrial park, in hectares, the best interpretation of x is the average number of trees per hectare in the industrial park.

Choice B is incorrect and may result from conceptual errors.

Choice C is incorrect and may result from conceptual errors.

Choice D is incorrect and may result from conceptual errors.

Question Difficulty: Medium

Question ID cec3c002

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: cec3c002

A store sells two different-sized containers of blueberries. The store's sales of these blueberries totaled **896.86** dollars last month. The equation $4.51x + 6.07y = 896.86$ represents this situation, where x is the number of smaller containers sold and y is the number of larger containers sold. According to the equation, what is the price, in dollars, of each smaller container?

ID: cec3c002 Answer

Correct Answer: 4.51, 451/100

Rationale

The correct answer is **4.51**. It's given that the equation $4.51x + 6.07y = 896.86$ represents this situation, where x is the number of smaller containers sold, y is the number of larger containers sold, and **896.86** is the store's total sales, in dollars, of blueberries last month. Therefore, $4.51x$ represents the store's sales, in dollars, of smaller containers, and $6.07y$ represents the store's sales, in dollars, of larger containers. Since x is the number of smaller containers sold, the price, in dollars, of each smaller container is **4.51**.

Question Difficulty: Medium

Question ID 524a5350

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: 524a5350

In the xy -plane, line t passes through the points $(0, 9)$ and $(1, 17)$. Which equation defines line t ?

- A. $y = \frac{1}{8}x + 9$
- B. $y = x + \frac{1}{8}$
- C. $y = x + 8$
- D. $y = 8x + 9$

ID: 524a5350 Answer

Correct Answer: D

Rationale

Choice D is correct. An equation defining a line in the xy -plane can be written in the form $y = mx + b$, where m represents the slope and $(0, b)$ represents the y -intercept of the line. It's given that line t passes through the point $(0, 9)$; therefore, $b = 9$. The slope, m , of a line can be found using any two points on the line, (x_1, y_1) and (x_2, y_2) , and the slope formula $m = \frac{y_2 - y_1}{x_2 - x_1}$. Substituting $(0, 9)$ and $(1, 17)$ for (x_1, y_1) and (x_2, y_2) , respectively, in the slope formula yields $m = \frac{17 - 9}{1 - 0}$, or $m = 8$. Substituting 8 for m and 9 for b in the equation $y = mx + b$ yields $y = 8x + 9$.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 012136ca

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: 012136ca

x	1	2	3
y	11	16	21

The table shows three values of x and their corresponding values of y . Which equation represents the linear relationship between x and y ?

- A. $y = 5x + 6$
- B. $y = 5x + 11$
- C. $y = 6x + 5$
- D. $y = 6x + 11$

ID: 012136ca Answer

Correct Answer: A

Rationale

Choice A is correct. The linear relationship between x and y can be represented by the equation $y = mx + b$, where m is the slope of the line in the xy -plane that represents the relationship, and b is the y -coordinate of the y -intercept. The slope can be computed using any two points on the line. The slope of a line between any two points, (x_1, y_1) and (x_2, y_2) , on the line can be calculated using the slope formula, $m = \frac{y_2 - y_1}{x_2 - x_1}$. In the given table, each value of x and its corresponding value of y can be represented by a point (x, y) . In the given table, when the value of x is 1, the corresponding value of y is 11 and when the value of x is 2, the corresponding value of y is 16. Therefore, the points $(1, 11)$ and $(2, 16)$ are on the line.

Substituting $(1, 11)$ and $(2, 16)$ for (x_1, y_1) and (x_2, y_2) , respectively, in the slope formula yields $m = \frac{16 - 11}{2 - 1}$, or $m = 5$.

Substituting 5 for m in the equation $y = mx + b$ yields $y = 5x + b$. Substituting the first value of x in the table, 1, and its corresponding value of y , 11, for x and y , respectively, in this equation yields $11 = 5(1) + b$, or $11 = b + 5$. Subtracting 5 from both sides of this equation yields $6 = b$. Substituting 6 for b in the equation $y = 5x + b$ yields $y = 5x + 6$. Therefore, the equation $y = 5x + 6$ represents the linear relationship between x and y .

Choice B is incorrect. For this relationship, when the value of x is 1, the corresponding value of y is 16, not 11.

Choice C is incorrect. For this relationship, when the value of x is 2, the corresponding value of y is 17, not 16.

Choice D is incorrect. For this relationship, when the value of x is 1, the corresponding value of y is 17, not 11.

Question Difficulty: Medium

Question ID dd31a371

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: dd31a371

$$2.5b + 5r = 80$$

The given equation describes the relationship between the number of birds, b , and the number of reptiles, r , that can be cared for at a pet care business on a given day. If the business cares for **16** reptiles on a given day, how many birds can it care for on this day?

- A. **0**
- B. **5**
- C. **40**
- D. **80**

ID: dd31a371 Answer

Correct Answer: A

Rationale

Choice A is correct. The number of birds can be found by calculating the value of b when $r = 16$ in the given equation. Substituting **16** for r in the given equation yields $2.5b + 5(16) = 80$, or $2.5b + 80 = 80$. Subtracting **80** from both sides of this equation yields $2.5b = 0$. Dividing both sides of this equation by **2.5** yields $b = 0$. Therefore, if the business cares for **16** reptiles on a given day, it can care for **0** birds on this day.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID ddfd6303

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: ddfd6303

$$2x + y = 37$$

In triangle QRS , sides QR and RS each have a length of x centimeters and side SQ has a length of y centimeters. The given equation represents this situation. Which of the following is the best interpretation of 37 in this context?

- A. The difference, in centimeters, between the lengths of sides QR and SQ
- B. The difference, in centimeters, between the lengths of sides QR and RS
- C. The sum of the lengths, in centimeters, of the three sides of the triangle
- D. The length, in centimeters, of one of the two sides of equal length

ID: ddfd6303 Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that in triangle QRS , sides QR and RS each have a length of x centimeters. Therefore, the expression $2x$ represents the sum of the lengths, in centimeters, of sides QR and RS . It's also given that side SQ has a length of y centimeters. Therefore, the expression $2x + y$ represents the sum of the lengths, in centimeters, of sides QR , RS , and SQ . Since $2x + y$ is the sum of the lengths, in centimeters, of the three sides of the triangle and $2x + y = 37$, it follows that 37 is the sum of the lengths, in centimeters, of the three sides of the triangle.

Choice A is incorrect. The difference, in centimeters, between the lengths of sides QR and SQ is $x - y$, not 37 .

Choice B is incorrect. The difference, in centimeters, between the lengths of sides QR and RS is $x - x$, or 0 , not 37 .

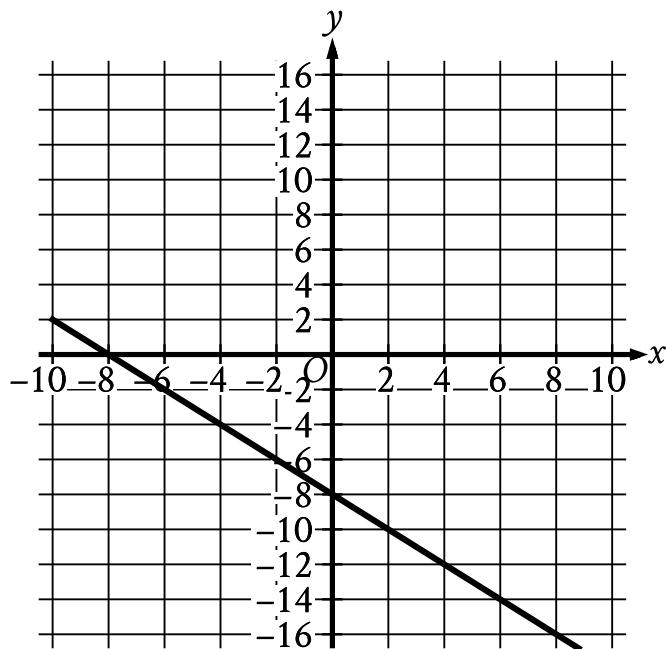
Choice D is incorrect. The length, in centimeters, of one of the two sides of equal length is x , not 37 .

Question Difficulty: Medium

Question ID 96ddb6a

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: 96ddb6a



What is an equation of the graph shown?

- A. $y = -2x - 8$
- B. $y = x - 8$
- C. $y = -x - 8$
- D. $y = 2x - 8$

ID: 96ddb6a Answer

Correct Answer: C

Rationale

Choice C is correct. An equation of a line can be written in the form $y = mx + b$, where m is the slope of the line and $(0, b)$ is the y -intercept of the line. The line shown passes through the point $(0, -8)$, so $b = -8$. The line shown also passes through the point $(-8, 0)$. The slope, m , of a line passing through two points (x_1, y_1) and (x_2, y_2) can be calculated using the equation $m = \frac{y_2 - y_1}{x_2 - x_1}$. For the points $(0, -8)$ and $(-8, 0)$, this gives $m = \frac{(-8) - 0}{0 - (-8)}$, or $m = -1$. Substituting -8 for b and -1 for m in $y = mx + b$ yields $y = (-1)x + (-8)$, or $y = -x - 8$. Therefore, an equation of the graph shown is $y = -x - 8$.

Choice A is incorrect. This is an equation of a line with a slope of **-2**, not **-1**.

Choice B is incorrect. This is an equation of a line with a slope of **1**, not **-1**.

Choice D is incorrect. This is an equation of a line with a slope of **2**, not **-1**.

Question Difficulty: Medium

Question ID 71dc13cb

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: 71dc13cb

Line t in the xy -plane has a slope of $-\frac{1}{3}$ and passes through the point $(9, 10)$. Which equation defines line t ?

- A. $y = 13x - \frac{1}{3}$
- B. $y = 9x + 10$
- C. $y = -\frac{x}{3} + 10$
- D. $y = -\frac{x}{3} + 13$

ID: 71dc13cb Answer

Correct Answer: D

Rationale

Choice D is correct. The equation that defines line t in the xy -plane can be written in slope-intercept form $y = mx + b$, where m is the slope of line t and $(0, b)$ is its y -intercept. It's given that line t has a slope of $-\frac{1}{3}$. Therefore, $m = -\frac{1}{3}$. Substituting $-\frac{1}{3}$ for m in the equation $y = mx + b$ yields $y = -\frac{1}{3}x + b$, or $y = -\frac{x}{3} + b$. It's also given that line t passes through the point $(9, 10)$. Substituting 9 for x and 10 for y in the equation $y = -\frac{x}{3} + b$ yields $10 = -\frac{9}{3} + b$, or $10 = -3 + b$. Adding 3 to both sides of this equation yields $13 = b$. Substituting 13 for b in the equation $y = -\frac{x}{3} + b$ yields $y = -\frac{x}{3} + 13$.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect. This equation defines a line that has a slope of 9, not $-\frac{1}{3}$, and passes through the point $(0, 10)$, not $(9, 10)$.

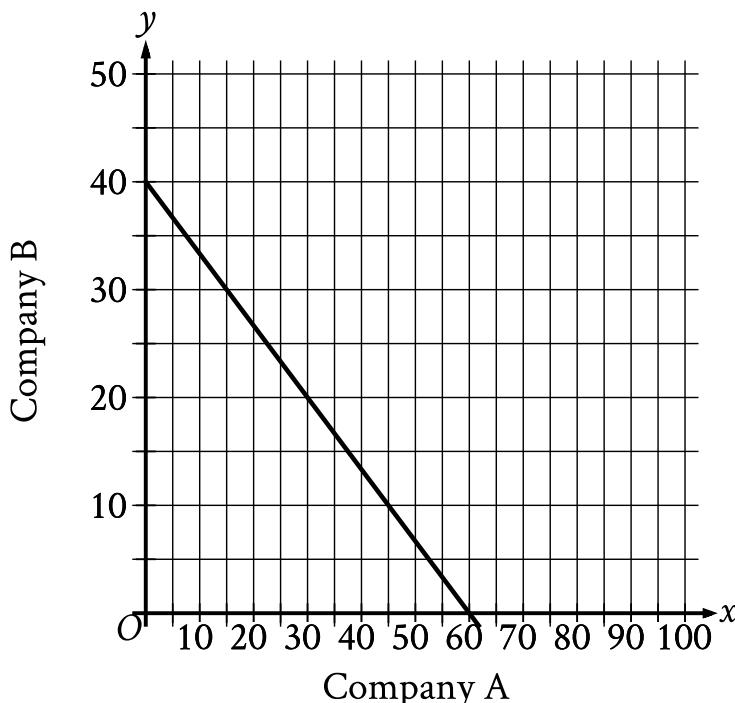
Choice C is incorrect. This equation defines a line that passes through the point $(0, 10)$, not $(9, 10)$.

Question Difficulty: Medium

Question ID 607bf204

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: 607bf204



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. $12x + 8y = 480$

ID: 607bf204 Answer

Correct Answer: B

Rationale

Choice B is correct. The graph shown is a line passing through the points $(0, 40)$ and $(60, 0)$. Since the relationship between x and y is linear, if two points on the graph make a linear equation true, then the equation represents the relationship. Substituting 0 for x and 40 for y in the equation in choice B, $8x + 12y = 480$, yields $8(0) + 12(40) = 480$, or $480 = 480$, which is true. Substituting 60 for x and 0 for y in the equation $8x + 12y = 480$ yields

$8(60) + 12(0) = 480$, or $480 = 480$, which is true. Therefore, the equation $8x + 12y = 480$ represents the relationship between x and y .

Choice A is incorrect. The point $(0, 40)$ is not on the graph of this equation, since $40 = 8(0) + 12$, or $40 = 12$, is not true.

Choice C is incorrect. The point $(0, 40)$ is not on the graph of this equation, since $40 = 12(0) + 8$, or $40 = 8$, is not true.

Choice D is incorrect. The point $(0, 40)$ is not on the graph of this equation, since $12(0) + 8(40) = 480$, or $320 = 480$, is not true.

Question Difficulty: Medium

Question ID c4aed842

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: c4aed842

A chemist combines water and acetic acid to make a mixture with a volume of **56 milliliters (mL)**. The volume of acetic acid in the mixture is **10 mL**. What is the volume of water, in **mL**, in the mixture? (Assume that the volume of the mixture is the sum of the volumes of water and acetic acid before they were mixed.)

ID: c4aed842 Answer

Correct Answer: 46

Rationale

The correct answer is **46**. It's given that a chemist combines water and acetic acid to make a mixture with a volume of **56 milliliters (mL)** and that the volume of acetic acid in the mixture is **10 mL**. Let x represent the volume of water, in mL, in the mixture. The equation $x + 10 = 56$ represents this situation. Subtracting **10** from both sides of this equation yields $x = 46$. Therefore, the volume of water, in mL, in the mixture is **46**.

Question Difficulty: Medium

Question ID b272276f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: b272276f

What is the slope of the graph of $y = \frac{1}{3}(29x + 10) + 5x$ in the xy -plane?

ID: b272276f Answer

Correct Answer: 14.66, 14.67, 44/3

Rationale

The correct answer is $\frac{44}{3}$. A linear equation can be written in the form $y = mx + b$, where m is the slope of the graph of the equation in the xy -plane and $(0, b)$ is the y -intercept. Distributing the $\frac{1}{3}$ in the equation $y = \frac{1}{3}(29x + 10) + 5x$ yields $y = \frac{29}{3}x + \frac{10}{3} + 5x$. Combining like terms on the right-hand side of this equation yields $y = \frac{44}{3}x + \frac{10}{3}$. This equation is in the form $y = mx + b$, where $m = \frac{44}{3}$ and $b = \frac{10}{3}$. Therefore, the slope of the graph of the given equation in the xy -plane is $\frac{44}{3}$. Note that 44/3, 14.66, and 14.67 are examples of ways to enter a correct answer.

Question Difficulty: Medium

Question ID 9df126c4

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: 9df126c4

What is the slope of the graph of $10x - 5y = -12$ in the xy -plane?

- A. -2
- B. $-\frac{5}{6}$
- C. $\frac{5}{6}$
- D. 2

ID: 9df126c4 Answer

Correct Answer: D

Rationale

Choice D is correct. A linear equation can be written in the form $y = mx + b$, where m is the slope of the graph of the equation in the xy -plane and $(0, b)$ is the y -intercept. Subtracting $10x$ from each side of the given equation, $10x - 5y = -12$, yields $-5y = -10x - 12$. Dividing each side of this equation by -5 yields $y = 2x + \frac{12}{5}$. This equation is in the form $y = mx + b$, where $m = 2$. Therefore, the slope of the graph of the given equation in the xy -plane is 2 .

Choice A is incorrect and may result from conceptual or calculation errors.

Choice B is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID 0969c4e8

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	Medium

ID: 0969c4e8

Line k is defined by $y = \frac{17}{7}x + 4$. Line j is parallel to line k in the xy -plane. What is the slope of line j ?

- A. $\frac{7}{17}$
- B. $\frac{17}{7}$
- C. 4
- D. 17

ID: 0969c4e8 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that line k is defined by $y = \frac{17}{7}x + 4$. For an equation of a line written in the form $y = mx + b$, m is the slope of the line and b is the y -coordinate of the y -intercept of the line. It follows that the slope of line k is $\frac{17}{7}$. It's also given that line j is parallel to line k in the xy -plane. Since parallel lines have equal slopes, line j also has a slope of $\frac{17}{7}$.

Choice A is incorrect and may result from conceptual or calculation errors.

Choice C is incorrect. This is the y -coordinate of the y -intercept of line k , not the slope of line j .

Choice D is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium