

Question ID 5e8699ad

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: 5e8699ad

Jay walks at a speed of **3** miles per hour and runs at a speed of **5** miles per hour. He walks for *w* hours and runs for *r* hours for a combined total of **14** miles. Which equation represents this situation?

- A. $3w + 5r = 14$
- B. $\frac{1}{3}w + \frac{1}{5}r = 14$
- C. $\frac{1}{3}w + \frac{1}{5}r = 112$
- D. $3w + 5r = 112$

ID: 5e8699ad Answer

Correct Answer: A

Rationale

Choice A is correct. Since Jay walks at a speed of 3 miles per hour for *w* hours, Jay walks a total of $3w$ miles. Since Jay runs at a speed of 5 miles per hour for *r* hours, Jay runs a total of $5r$ miles. Therefore, the total number of miles Jay travels can be represented by $3w + 5r$. Since the combined total number of miles is 14, the equation $3w + 5r = 14$ represents this situation.

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 ac02dad2

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: ac02dad2

$$2x + y = 37$$

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: ac02dad2 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 bd243919

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: bd243919

The equation $40x + 20y = 160$ represents the number of sweaters, x , and number of shirts, y , that Yesenia purchased for \$160. If Yesenia purchased 2 sweaters, how many shirts did she purchase?

- A. 3
- B. 4
- C. 8
- D. 40

ID: bd243919 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that the equation $40x + 20y = 160$ represents the number of sweaters, x , and the number of shirts, y , that Yesenia purchased for \$ 160. If Yesenia purchased 2 sweaters, the number of shirts she purchased can be calculated by substituting 2 for x in the given equation, which yields $40(2) + 20y = 160$, or $80 + 20y = 160$. Subtracting 80 from both sides of this equation yields $20y = 80$. Dividing both sides of this equation by 20 yields $y = 4$. Therefore, if Yesenia purchased 2 sweaters, she purchased 4 shirts.

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

Choice C is incorrect. This is the number of shirts Yesenia purchased if she purchased 0 sweaters.

Choice D is incorrect. This is the price, in dollars, for each sweater, not the number of shirts Yesenia purchased.

Question Difficulty: Medium

Question ID 304668b4

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: 304668b4

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

ID: 304668b4 Answer

Correct Answer: .3846, 5/13

Rationale

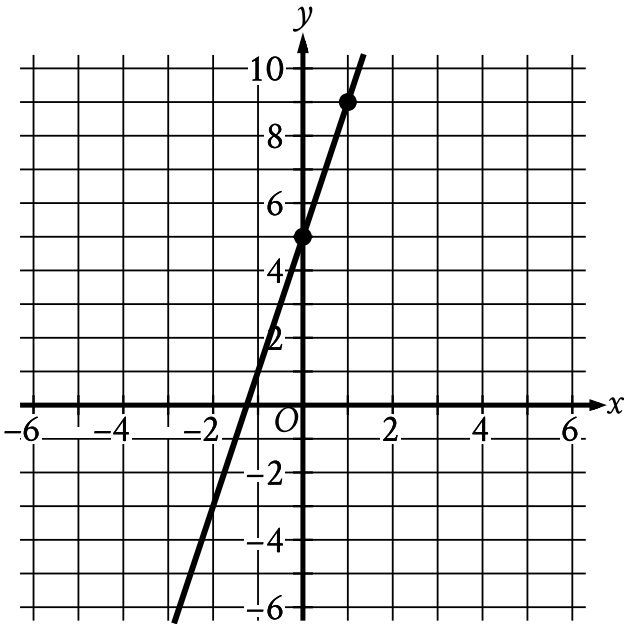
The correct answer is $\frac{5}{13}$. The graph of a line in the xy -plane can be represented by the equation $y = mx + b$, where m is the slope of the line and b is the y -coordinate of the y -intercept. The given equation can be written as $y = \frac{5}{13}x - 23$. Therefore, the slope of the graph 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 143330a1

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: 143330a1



Line j is shown in the xy -plane. Line k (not shown) is parallel to line j . What is the slope of line k ?

ID: 143330a1 Answer

Correct Answer: 4

Rationale

The correct answer is 4. It's given that line k is parallel to line j . It follows that the slope of line k is equal to the slope of line j . Given two points on a line in the xy -plane, x_1, y_1 and x_2, y_2 , the slope of the line can be calculated as $\frac{y_2 - y_1}{x_2 - x_1}$. In the xy -plane shown, the points 0, 5 and 1, 9 are on line j . It follows that the slope of line j is $\frac{9 - 5}{1 - 0}$, or 4. Since the slope of line j is equal to the slope of line k , the slope of line k is also 4.

Question Difficulty: Medium

Question ID 42258aab

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: 42258aab

The y-intercept of the graph of $12x + 2y = 18$ in the xy -plane is $(0, y)$. What is the value of y ?

ID: 42258aab Answer

Correct Answer: 9

Rationale

The correct answer is 9. It's given that the y-intercept of the graph of $12x + 2y = 18$ in the xy -plane is $0, y$. Substituting 0 for x in the equation $12x + 2y = 18$ yields $12(0) + 2y = 18$, or $2y = 18$. Dividing both sides of this equation by 2 yields $y = 9$. Therefore, the value of y is 9.

Question Difficulty: Medium

Question ID 144d0888

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: 144d0888

The y-intercept of the graph of $y = -6x - 32$ in the xy -plane is $(0, y)$. What is the value of y ?

ID: 144d0888 Answer

Correct Answer: -32

Rationale

The correct answer is -32. It’s given that the y -intercept of the graph of $y = -6x - 32$ is $0, y$. Substituting 0 for x in this equation yields $y = -6(0) - 32$, or $y = -32$. Therefore, the value of y that corresponds to the y -intercept of the graph of $y = -6x - 32$ in the xy -plane is -32.

Question Difficulty: Medium

Question ID 805354f5

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: 805354f5

Line k is defined by $y = \frac{1}{4}x + 1$. Line j is parallel to line k in the xy -plane. What is the slope of j ?

ID: 805354f5 Answer

Correct Answer: .25, 1/4

Rationale

The correct answer is $\frac{1}{4}$. It's given that line k is defined by $y = \frac{1}{4}x + 1$. It's also given that line j is parallel to line k in the xy -plane. A line in the xy -plane represented by an equation in slope-intercept form $y = mx + b$ has a slope of m and a y -intercept of $0, b$. Therefore, the slope of line k is $\frac{1}{4}$. Since parallel lines have equal slopes, the slope of line j is $\frac{1}{4}$. Note that 1/4 and .25 are examples of ways to enter a correct answer.

Question Difficulty: Medium

Question ID 374cb937

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: 374cb937

Last week, an interior designer earned a total of **\$1,258** from consulting for x hours and drawing up plans for y hours. The equation $68x + 85y = 1,258$ represents this situation. Which of the following is the best interpretation of **68** in this context?

- A. The interior designer earned **\$68** per hour consulting last week.
- B. The interior designer worked **68** hours drawing up plans last week.
- C. The interior designer earned **\$68** per hour drawing up plans last week.
- D. The interior designer worked **68** hours consulting last week.

ID: 374cb937 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that $68x + 85y = 1,258$ represents the situation where an interior designer earned a total of \$ 1,258 last week from consulting for x hours and drawing up plans for y hours. Thus, $68x$ represents the amount earned, in dollars, from consulting for x hours, and $85y$ represents the amount earned, in dollars, from drawing up plans for y hours. Since $68x$ represents the amount earned, in dollars, from consulting for x hours, it follows that the interior designer earned \$ 68 per hour consulting last week.

Choice B is incorrect. The interior designer worked y hours, not 68 hours, drawing up plans last week.

Choice C is incorrect. The interior designer earned \$ 85 per hour, not \$ 68 per hour, drawing up plans last week.

Choice D is incorrect. The interior designer worked x hours, not 68 hours, consulting last week.

Question Difficulty: Medium

Question ID 79d9c537

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: 79d9c537

A teacher is creating an assignment worth **70** points. The assignment will consist of questions worth **1** point and questions worth **3** points. Which equation represents this situation, where ***x*** represents the number of **1**-point questions and ***y*** represents the number of **3**-point questions?

- A. **$4xy = 70$**
- B. **$4(x + y) = 70$**
- C. **$3x + y = 70$**
- D. **$x + 3y = 70$**

ID: 79d9c537 Answer

Correct Answer: D

Rationale

Choice D is correct. Since *x* represents the number of 1-point questions and *y* represents the number of 3-point questions, the assignment is worth a total of $1 \cdot x + 3 \cdot y$, or $x + 3y$, points. Since the assignment is worth 70 points, the equation $x + 3y = 70$ represents this situation.

Choice A is incorrect and may result from conceptual errors.

Choice B is incorrect and may result from conceptual errors.

Choice C is incorrect and may result from conceptual errors.

Question Difficulty: Medium

Question ID 07cab4f0

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: 07cab4f0

A store sells two different-sized containers of a certain Greek yogurt. The store's sales of this Greek yogurt totaled **1,277.94** dollars last month. The equation **$5.48x + 7.30y = 1,277.94$** 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, which of the following represents the price, in dollars, of each smaller container?

- A. **5.48**
- B. **$7.30y$**
- C. **7.30**
- D. **$5.48x$**

ID: 07cab4f0 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that the store's sales of a certain Greek yogurt totaled 1,277.94 dollars last month. It's also given that the equation $5.48x + 7.30y = 1,277.94$ represents this situation, where x is the number of smaller containers sold and y is the number of larger containers sold. Since x represents the number of smaller containers of yogurt sold, the expression $5.48x$ represents the total sales, in dollars, from smaller containers of yogurt. This means that x smaller containers of yogurt were sold at a price of 5.48 dollars each. Therefore, according to the equation, 5.48 represents the price, in dollars, of each smaller container.

Choice B is incorrect. This expression represents the total sales, in dollars, from selling y larger containers of yogurt.

Choice C is incorrect. This value represents the price, in dollars, of each larger container of yogurt.

Choice D is incorrect. This expression represents the total sales, in dollars, from selling x smaller containers of yogurt.

Question Difficulty: Medium

Question ID a854ff94

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: a854ff94

$2.5b + 5r = 80$

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: a854ff94 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 09f4035b

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: 09f4035b

Davio bought some potatoes and celery. The potatoes cost **\$0.69** per pound, and the celery cost **\$0.99** per pound. If Davio spent **\$5.34** in total and bought twice as many pounds of celery as pounds of potatoes, how many pounds of celery did Davio buy?

- A. **2**
- B. **2.5**
- C. **2.67**
- D. **4**

ID: 09f4035b Answer

Correct Answer: D

Rationale

Choice D is correct. Let p represent the number of pounds of potatoes and let c represent the number of pounds of celery that Davio bought. It's given that potatoes cost \$ 0.69 per pound and celery costs \$ 0.99 per pound. If Davio spent \$ 5.34 in total, then the equation $0.69p + 0.99c = 5.34$ represents this situation. It's also given that Davio bought twice as many pounds of celery as pounds of potatoes; therefore, $c = 2p$. Substituting $2p$ for c in the equation $0.69p + 0.99c = 5.34$ yields $0.69p + 0.992p = 5.34$, which is equivalent to $0.69p + 1.98p = 5.34$, or $2.67p = 5.34$. Dividing both sides of this equation by 2.67 yields $p = 2$. Substituting 2 for p in the equation $c = 2p$ yields $c = 22$, or $c = 4$. Therefore, Davio bought 4 pounds of celery.

Choice A is incorrect. This is the number of pounds of potatoes, not the number of pounds of celery, Davio bought.

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

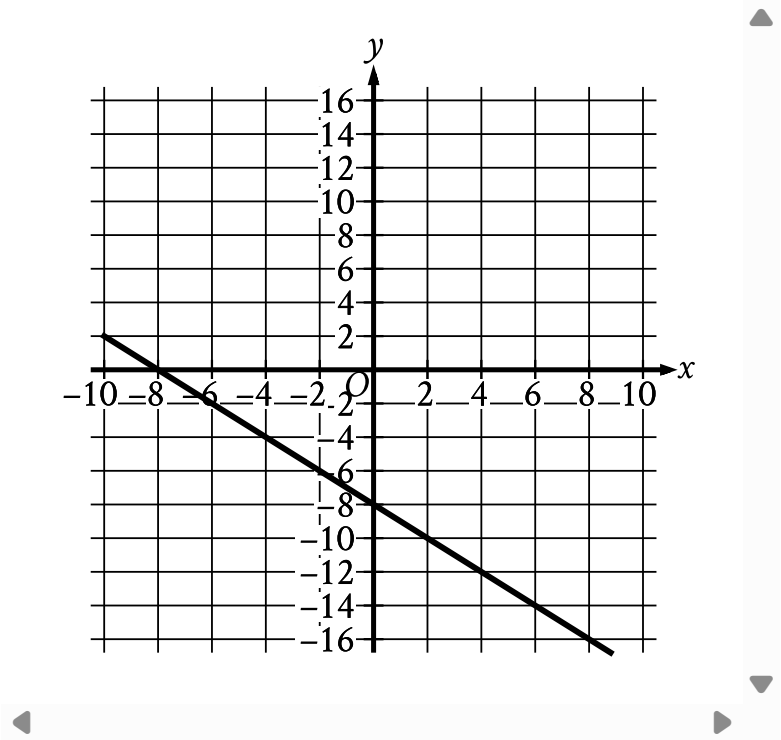
Choice C is incorrect and may result from conceptual or calculation errors.

Question Difficulty: Medium

Question ID ea3f862c

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: ea3f862c



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: ea3f862c 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 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 $m = \frac{0 - (-8)}{-8 - 0}$, or $m = -1$. Substituting -8 for b and -1 for m in $y = mx + b$ yields $y = -1x - 8$, 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 d4915b30

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: d4915b30

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: d4915b30 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 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 ec9fddca

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: ec9fddca

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: ec9fddca 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 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 26c46450

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: 26c46450

A line in the xy -plane has a slope of $\frac{1}{9}$ and passes through the point $(0, 14)$. Which equation represents this line?

- A. $y = -\frac{1}{9}x - 14$
- B. $y = -\frac{1}{9}x + 14$
- C. $y = \frac{1}{9}x - 14$
- D. $y = \frac{1}{9}x + 14$

ID: 26c46450 Answer

Correct Answer: D

Rationale

Choice D is correct. The equation of a line in the xy -plane can be written as $y = mx + b$, where m represents the slope of the line and b represents the y -intercept of the line. It's given that the slope of the line is $\frac{1}{9}$. It follows that $m = \frac{1}{9}$. It's also given that the line passes through the point $(0, 14)$. It follows that $b = 14$. Substituting $\frac{1}{9}$ for m and 14 for b in $y = mx + b$ yields $y = \frac{1}{9}x + 14$. Thus, the equation $y = \frac{1}{9}x + 14$ represents this line.

Choice A is incorrect. This equation represents a line with a slope of $-\frac{1}{9}$ and a y -intercept of $(0, -14)$.

Choice B is incorrect. This equation represents a line with a slope of $-\frac{1}{9}$ and a y -intercept of $(0, 14)$.

Choice C is incorrect. This equation represents a line with a slope of $\frac{1}{9}$ and a y -intercept of $(0, -14)$.

Question Difficulty: Medium

Question ID 3b0116a2

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: 3b0116a2

A machine makes large boxes or small boxes, one at a time, for a total of **700** minutes each day. It takes the machine **10** minutes to make a large box or **5** minutes to make a small box. Which equation represents the possible number of large boxes, x , and small boxes, y , the machine can make each day?

- A. $5x + 10y = 700$
- B. $10x + 5y = 700$
- C. $(x + y)(10 + 5) = 700$
- D. $(10 + x)(5 + y) = 700$

ID: 3b0116a2 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that it takes the machine 10 minutes to make a large box. It's also given that x represents the possible number of large boxes the machine can make each day. Multiplying 10 by x gives $10x$, which represents the amount of time spent making large boxes. It's given that it takes the machine 5 minutes to make a small box. It's also given that y represents the possible number of small boxes the machine can make each day. Multiplying 5 by y gives $5y$, which represents the amount of time spent making small boxes. Combining the amount of time spent making x large boxes and y small boxes yields $10x + 5y$. It's given that the machine makes boxes for a total of 700 minutes each day. Therefore $10x + 5y = 700$ represents the possible number of large boxes, x , and small boxes, y , the machine can make each day.

Choice A is incorrect and may result from associating the time of 10 minutes with small, rather than large, boxes and the time of 5 minutes with large, rather than small, boxes.

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 1d1e6588

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: 1d1e6588

The equation $46 = 2x + 2y$ gives the perimeter of a rectangular rug that has length x , in feet, and width y , in feet. The width of the rug is 8 feet. What is the length, in feet, of the rug?

ID: 1d1e6588 Answer

Correct Answer: 15

Rationale

The correct answer is 15. It's given that the equation $46 = 2x + 2y$ gives the perimeter of a rectangular rug that has length x , in feet, and width y , in feet. It's also given that the width of the rug is 8 feet. Substituting 8 for y in the equation $46 = 2x + 2y$ yields $46 = 2x + 28$, or $46 = 2x + 16$. Subtracting 16 from both sides of this equation yields $30 = 2x$. Dividing both sides of this equation by 2 yields $15 = x$. Since x represents the length, in feet, of the rug, it follows that the length of the rug is 15 feet.

Question Difficulty: Medium

Question ID 862cc556

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: 862cc556

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: 862cc556 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 be8e1f90

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: be8e1f90

Vivian bought party hats and cupcakes for **\$71**. Each package of party hats cost **\$3**, and each cupcake cost **\$1**. If Vivian bought **10** packages of party hats, how many cupcakes did she buy?

ID: be8e1f90 Answer

Correct Answer: 41

Rationale

The correct answer is 41. The number of cupcakes Vivian bought can be found by first finding the amount Vivian spent on cupcakes. The amount Vivian spent on cupcakes can be found by subtracting the amount Vivian spent on party hats from the total amount Vivian spent. The amount Vivian spent on party hats can be found by multiplying the cost per package of party hats by the number of packages of party hats, which yields $\$3 \cdot 10$, or $\$30$. Subtracting the amount Vivian spent on party hats, $\$30$, from the total amount Vivian spent, $\$71$, yields $\$71 - \30 , or $\$41$. Since the amount Vivian spent on cupcakes was $\$41$ and each cupcake cost $\$1$, it follows that Vivian bought 41 cupcakes.

Question Difficulty: Medium

Question ID f707b663

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: f707b663

x	y
0	18
1	13
2	8

The table shows three values of x and their corresponding values of y . There is a linear relationship between x and y . Which of the following equations represents this relationship?

- A. $y = 18x + 13$
- B. $y = 18x + 18$
- C. $y = -5x + 13$
- D. $y = -5x + 18$

ID: f707b663 Answer

Correct Answer: D

Rationale

Choice D is correct. A linear relationship can be represented by an equation of the form $y = mx + b$, where m and b are constants. It's given in the table that when $x = 0$, $y = 18$. Substituting 0 for x and 18 for y in $y = mx + b$ yields $18 = m0 + b$, or $18 = b$. Substituting 18 for b in the equation $y = mx + b$ yields $y = mx + 18$. It's also given in the table that when $x = 1$, $y = 13$. Substituting 1 for x and 13 for y in the equation $y = mx + 18$ yields $13 = m1 + 18$, or $13 = m + 18$. Subtracting 18 from both sides of this equation yields $-5 = m$. Therefore, the equation $y = -5x + 18$ represents the relationship between x and y .

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 a75d2a8c

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: a75d2a8c

What is the equation of the line that passes through the point $(0, 5)$ and is parallel to the graph of $y = 7x + 4$ in the xy -plane?

- A. $y = 5x$
- B. $y = 7x + 5$
- C. $y = 7x$
- D. $y = 5x + 7$

ID: a75d2a8c Answer

Correct Answer: B

Rationale

Choice B is correct. The equation of a line in the xy -plane can be written in slope-intercept form $y = mx + b$, where m is the slope of the line and b is its y -intercept. It's given that the line passes through the point $0, 5$. Therefore, $b = 5$. It's also given that the line is parallel to the graph of $y = 7x + 4$, which means the line has the same slope as the graph of $y = 7x + 4$. The slope of the graph of $y = 7x + 4$ is 7. Therefore, $m = 7$. Substituting 7 for m and 5 for b in the equation $y = mx + b$ yields $y = 7x + 5$.

Choice A is incorrect. The graph of this equation passes through the point $0, 0$, not $0, 5$, and has a slope of 5, not 7.

Choice C is incorrect. The graph of this equation passes through the point $0, 0$, not $0, 5$.

Choice D is incorrect. The graph of this equation passes through the point $0, 7$, not $0, 5$, and has a slope of 5, not 7.

Question Difficulty: Medium

Question ID 244273dd

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Algebra	Linear equations in two variables	<div><div></div><div></div><div></div></div>

ID: 244273dd

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: 244273dd 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 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