Question Bank

Math

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Linear Equations in Two Variables (key)

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Question ID ee846db7

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

ID: ee846db7

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: ee846db7 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: Easy

Question ID 5b8a8475

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

ID: 5b8a8475

Line k is defined by $y = 3x + 15$. Line j is perpendicular to line k in the *xy*-plane. What is the slope of line j?

A. $-\frac{1}{3}$

B. $-\frac{1}{12}$

C. $-\frac{1}{18}$

D. $-\frac{1}{45}$

ID: 5b8a8475 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that line j is perpendicular to line k in the *xy*-plane. It follows that the slope of line j is the opposite reciprocal of the slope of line k. The equation for line k 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 3. The opposite reciprocal of a number is -1 divided by the number. Thus, the opposite reciprocal of 3 is $-\frac{1}{3}$. Therefore, the slope of line j is $-\frac{1}{3}$.

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: Easy

Question ID b23bba4c

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

ID: b23bba4c

$3a+4b=25$

A shipping company charged a customer $25 to ship some small boxes and some large boxes. The equation above represents the relationship between *a*, the number of small boxes, and *b*, the number of large boxes, the customer had shipped. If the customer had 3 small boxes shipped, how many large boxes were shipped?

A. 3

B. 4

C. 5

D. 6

ID: b23bba4c Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that a represents the number of small boxes and b represents the number of large boxes the customer had shipped. If the customer had 3 small boxes shipped, then $a=3$. Substituting 3 for a in the equation $3a+4b=25$ yields $3(3)+4b=25$ or $9+4b=25$. Subtracting 9 from both sides of the equation yields $4b=16$. Dividing both sides of this equation by 4 yields $b=4$. Therefore, the customer had 4 large boxes shipped.

Choices A, C, and D are incorrect. If the number of large boxes shipped is 3, then $b=3$. Substituting 3 for b in the given equation yields $3a+4(3)=25$ or $3a+12=25$. Subtracting 12 from both sides of the equation and then dividing by 3 yields $a=\frac{13}{3}$. However, it's given that the number of small boxes shipped, a, is 3, not $\frac{13}{3}$, so b cannot equal 3. Similarly, if $b=5$ or $b=6$, then $a=\frac{5}{3}$ or $a=\frac{1}{3}$, respectively, which is also not true.

Question Difficulty: Easy

Question ID 87322577

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

ID: 87322577

$x + y = 75$

The equation above relates the number of minutes, x, Maria spends running each day and the number of minutes, y, she spends biking each day. In the equation, what does the number 75 represent?

A. The number of minutes spent running each day

B. The number of minutes spent biking each day

C. The total number of minutes spent running and biking each day

D. The number of minutes spent biking for each minute spent running

ID: 87322577 Answer

Correct Answer: C

Rationale

Choice C is correct. Maria spends x minutes running each day and y minutes biking each day. Therefore, $x + y$ represents the total number of minutes Maria spent running and biking each day. Because $x + y = 75$, it follows that 75 is the total number of minutes that Maria spent running and biking each day.

Choices A and B are incorrect. The number of minutes Maria spent running each day is represented by x and need not be 75. Similarly, the number of minutes that Maria spends biking each day is represented by y and need not be 75. The number of minutes Maria spends running each day and biking each day may vary; however, the total number of minutes she spends each day on these activities is constant and equal to 75. Choice D is incorrect. The number of minutes Maria spent biking for each minute spent running cannot be determined from the information provided.

Question Difficulty: Easy

Question ID c6b151d4

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

ID: c6b151d4

A total of 364 paper straws of equal length were used to construct two types of polygons: triangles and rectangles. The triangles and rectangles were constructed so that no two polygons had a common side. The equation $3x + 4y = 364$ represents this situation, where x is the number of triangles constructed and y is the number of rectangles constructed. What is the best interpretation of $(x, y) = (24, 73)$ in this context?

A. If 24 triangles were constructed, then 73 rectangles were constructed.

B. If 24 triangles were constructed, then 73 paper straws were used.

C. If 73 triangles were constructed, then 24 rectangles were constructed.

D. If 73 triangles were constructed, then 24 paper straws were used.

ID: c6b151d4 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that 364 paper straws of equal length were used to construct triangles and rectangles, where no two polygons had a common side. It's also given that the equation $3x + 4y = 364$ represents this situation, where x is the number of triangles constructed and y is the number of rectangles constructed. The equation $(x, y) = (24, 73)$ means that if $x = 24$, then $y = 73$. Substituting 24 for x and 73 for y in $3x + 4y = 364$ yields $3(24) + 4(73) = 364$, or $364 = 364$, which is true. Therefore, in this context, the equation $(x, y) = (24, 73)$ means that if 24 triangles were constructed, then 73 rectangles were constructed.

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: Easy

Question ID 8c98c834

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

ID: 8c98c834

The equation $y = 0.1x$ models the relationship between the number of different pieces of music a certain pianist practices, *y*, during an *x*-minute practice session. How many pieces did the pianist practice if the session lasted 30 minutes?

A. 1

B. 3

C. 10

D. 30

ID: 8c98c834 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that the equation $y = 0.1x$ models the relationship between the number of different pieces of music a certain pianist practices, y, and the number of minutes in a practice session, x. Since it's given that the session lasted 30 minutes, the number of pieces the pianist practiced can be found by substituting 30 for x in the given equation, which yields $y = 0.1(30)$, or $y = 3$.

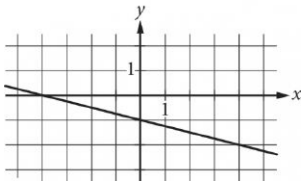
Choices A and C are incorrect and may result from misinterpreting the values in the equation. Choice D is incorrect. This is the given value of x, not the value of y.

Question Difficulty: Easy

Question ID b2845d88

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

ID: b2845d88



Which of the following is an equation of the graph shown in the *xy*-plane above?

A. $y = -\frac{1}{4}x - 1$

B. $y = -x - 4$

C. $y = -x - \frac{1}{4}$

D. $y = -4x - 1$

ID: b2845d88 Answer

Correct Answer: A

Rationale

Choice A is correct. The slope of the line can be found by choosing any two points on the line, such as (4, −2) and (0, −1). Subtracting the y-values results in −2 − (−1) = −1, the change in y. Subtracting the x-values results in 4 − 0 = 4, the change in *x*. Dividing the change in y by the change in *x* yields $-1 \div 4 = -\frac{1}{4}$, the slope. The line intersects the y-axis at (0, −1), so −1 is the y-coordinate of the y-intercept. This information can be expressed in slope-intercept form as the equation $y = -\frac{1}{4}x - 1$.

Choice B is incorrect and may result from incorrectly calculating the slope and then misidentifying the slope as the y-intercept. Choice C is incorrect and may result from misidentifying the slope as the y-intercept. Choice D is incorrect and may result from incorrectly calculating the slope.

Question Difficulty: Easy

Question ID b450ab03

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

ID: b450ab03

An employee at a restaurant prepares sandwiches and salads. It takes the employee 1.5 minutes to prepare a sandwich and 1.9 minutes to prepare a salad. The employee spends a total of 46.1 minutes preparing x sandwiches and y salads. Which equation represents this situation?

A. $1.9x + 1.5y = 46.1$

B. $1.5x + 1.9y = 46.1$

C. $x + y = 46.1$

D. $30.7x + 24.3y = 46.1$

ID: b450ab03 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that the employee takes 1.5 minutes to prepare a sandwich. Multiplying 1.5 by the number of sandwiches, x, yields $1.5x$, the amount of time the employee spends preparing x sandwiches. It's also given that the employee takes 1.9 minutes to prepare a salad. Multiplying 1.9 by the number of salads, y, yields $1.9y$, the amount of time the employee spends preparing y salads. It follows that the total amount of time, in minutes, the employee spends preparing x sandwiches and y salads is $1.5x + 1.9y$. It's given that the employee spends a total of 46.1 minutes preparing x sandwiches and y salads. Thus, the equation $1.5x + 1.9y = 46.1$ represents this situation.

Choice A is incorrect. This equation represents a situation where it takes the employee 1.9 minutes, rather than 1.5 minutes, to prepare a sandwich and 1.5 minutes, rather than 1.9 minutes, to prepare a salad.

Choice C is incorrect. This equation represents a situation where it takes the employee 1 minute, rather than 1.5 minutes, to prepare a sandwich and 1 minute, rather than 1.9 minutes, to prepare a salad.

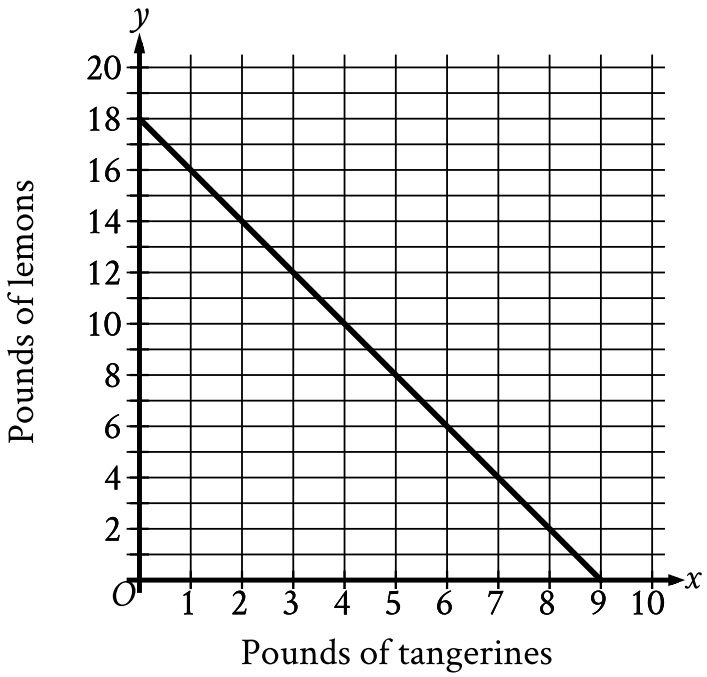
Choice D is incorrect. This equation represents a situation where it takes the employee 30.7 minutes, rather than 1.5 minutes, to prepare a sandwich and 24.3 minutes, rather than 1.9 minutes, to prepare a salad.

Question Difficulty: Easy

Question ID 8368afd1

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

ID: 8368afd1



The graph shows the possible combinations of the number of pounds of tangerines and lemons that could be purchased for $\$18$ at a certain store. If Melvin purchased lemons and 4 pounds of tangerines for a total of $\$18$, how many pounds of lemons did he purchase?

A. 7

B. 10

C. 14

D. 16

ID: 8368afd1 Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that the graph shows the possible combinations of the number of pounds of tangerines, x, and the number of pounds of lemons, y, that could be purchased for $\$18$ at a certain store. If Melvin purchased lemons and 4 pounds of tangerines for a total of $\$18$, the number of pounds of lemons he purchased is represented by the y-coordinate of the point on the graph where $x = 4$. For the graph shown, when $x = 4$, $y = 10$. Therefore, if Melvin purchased lemons and 4 pounds of tangerines for a total of $\$18$, then he purchased 10 pounds of lemons.

Choice A is incorrect. This is the number of pounds of tangerines Melvin purchased if he purchased tangerines and 4 pounds of lemons for a total of $\$18$.

Choice C is incorrect. This is the number of pounds of lemons Melvin purchased if he purchased lemons and 2 pounds of tangerines for a total of $\$18$.

Choice D is incorrect. This is the number of pounds of lemons Melvin purchased if he purchased lemons and 1 pound of tangerines for a total of $\$18$.

Question Difficulty: Easy

Question ID 8adf1335

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

ID: 8adf1335

A city's total expense budget for one year was *x* million dollars. The city budgeted *y* million dollars for departmental expenses and 201 million dollars for all other expenses. Which of the following represents the relationship between *x* and *y* in this context?

A. $x+y=201$

B. $x-y=201$

C. $2x-y=201$

D. $y-x=201$

ID: 8adf1335 Answer

Correct Answer: B

Rationale

Choice B is correct. Of the city's total expense budget for one year, the city budgeted y million dollars for departmental expenses and 201 million dollars for all other expenses. This means that the expression $y+201$ represents the total expense budget, in millions of dollars, for one year. It's given that the total expense budget for one year is x million dollars. It follows then that the expression $y+201$ is equivalent to x, or $y+201=x$. Subtracting y from both sides of this equation yields $201=x-y$. By the symmetric property of equality, this is the same as $x-y=201$.

Choices A and C are incorrect. Because it's given that the total expense budget for one year, x million dollars, is comprised of the departmental expenses, y million dollars, and all other expenses, 201 million dollars, the expressions $x+y$ and $2x-y$ both must be equivalent to a value greater than 201 million dollars. Therefore, the equations $x+y=201$ and $2x-y=201$ aren't true. Choice D is incorrect. The value of x must be greater than the value of y. Therefore, $y-x=201$ can't represent this relationship.

Question Difficulty: Easy

Question ID dd797fe2

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

ID: dd797fe2

$4x+3y=24$

Mario purchased 4 binders that cost *x* dollars each and 3 notebooks that cost *y* dollars each. If the given equation represents this situation, which of the following is the best interpretation of 24 in this context?

A. The total cost, in dollars, for all binders purchased

B. The total cost, in dollars, for all notebooks purchased

C. The total cost, in dollars, for all binders and notebooks purchased

D. The difference in the total cost, in dollars, between the number of binders and notebooks purchased

ID: dd797fe2 Answer

Correct Answer: C

Rationale

Choice C is correct. Since Mario purchased 4 binders that cost x dollars each, the expression $4x$ represents the total cost, in dollars, of the 4 binders he purchased. Since Mario purchased 3 notebooks that cost y dollars each, the expression $3y$ represents the total cost, in dollars, of the 3 notebooks he purchased. Therefore, the expression $4x+3y$ represents the total cost, in dollars, for all binders and notebooks he purchased. In the given equation, the expression $4x+3y$ is equal to 24. Therefore, it follows that 24 is the total cost, in dollars, for all binders and notebooks purchased.

Choice A is incorrect. This is represented by the expression $4x$ in the given equation. Choice B is incorrect. This is represented by the expression $3y$ in the given equation. Choice D is incorrect. This is represented by the expression $|4x-3y|$.

Question Difficulty: Easy

Question ID 789975b7

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

ID: 789975b7

A gardener buys two kinds of fertilizer. Fertilizer A contains 60% filler materials by weight and Fertilizer B contains 40% filler materials by weight. Together, the fertilizers bought by the gardener contain a total of 240 pounds of filler materials. Which equation models this relationship, where x is the number of pounds of Fertilizer A and y is the number of pounds of Fertilizer B?

A. $0.4x + 0.6y = 240$

B. $0.6x + 0.4y = 240$

C. $40x + 60y = 240$

D. $60x + 40y = 240$

ID: 789975b7 Answer

Correct Answer: B

Rationale

Choice B is correct. Since Fertilizer A contains 60% filler materials by weight, it follows that x pounds of Fertilizer A consists of 0.6x pounds of filler materials. Similarly, y pounds of Fertilizer B consists of 0.4y pounds of filler materials. When x pounds of Fertilizer A and y pounds of Fertilizer B are combined, the result is 240 pounds of filler materials. Therefore, the total amount, in pounds, of filler materials in a mixture of x pounds of Fertilizer A and y pounds of Fertilizer B can be expressed as $0.6x + 0.4y = 240$.

Choice A is incorrect. This choice transposes the percentages of filler materials for Fertilizer A and Fertilizer B. Fertilizer A consists of 0.6x pounds of filler materials and Fertilizer B consists of 0.4y pounds of filler materials. Therefore, $0.6x + 0.4y$ is equal to 240, not $0.4x + 0.6y$. Choice C is incorrect. This choice transposes the percentages of filler materials for Fertilizer A and Fertilizer B and incorrectly represents how to take the percentage of a value mathematically. Choice D is incorrect. This choice incorrectly represents how to take the percentage of a value mathematically. Fertilizer A consists of 0.6x pounds of filler materials, not 60x pounds of filler materials, and Fertilizer B consists of 0.4y pounds of filler materials, not 40y pounds of filler materials.

Question Difficulty: Easy

Question ID 2554b413

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

ID: 2554b413

In the *xy*-plane, a line has a slope of 6 and passes through the point $(0,8)$.

Which of the following is an equation of this line?

A. $y = 6x + 8$

B. $y = 6x + 48$

C. $y = 8x + 6$

D. $y = 8x + 48$

ID: 2554b413 Answer

Correct Answer: A

Rationale

Choice A is correct. The slope-intercept form of an equation for a line is $y = mx + b$, where m is the slope of the line and b is the y-coordinate of the y-intercept of the line. It's given that the slope is 6, so $m = 6$. It's also given that the line passes through the point $(0,8)$ on the y-axis, so $b = 8$. Substituting $m = 6$ and $b = 8$ into the equation $y = mx + b$ gives $y = 6x + 8$.

Choices B, C, and D are incorrect and may result from misinterpreting the slope-intercept form of an equation of a line.

Question Difficulty: Easy

Question ID 52a8ef85

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

ID: 52a8ef85

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: 52a8ef85 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: Easy

Question ID dfa45424

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

ID: dfa45424

Tony spends $80 per month on public transportation. A 10-ride pass costs $12.50, and a single-ride pass costs $1.50. If g represents the number of 10-ride passes Tony buys in a month and t represents the number of single-ride passes Tony buys in a month, which of the following equations best represents the relationship between g and t ?

A. $g+t=80$

B. $g+t=1.50+12.50$

C. $1.50g+12.50t=80$

D. $12.50g+1.50t=80$

ID: dfa45424 Answer

Correct Answer: D

Rationale

Choice D is correct. Since a 10-ride pass costs $12.50 and g is the number of 10-ride passes Tony buys in a month, the expression $12.50g$ represents the amount Tony spends on 10-ride passes in a month. Since a single-ride pass costs $1.50 and t is the number of single-ride passes Tony buys in a month, the expression $1.50t$ represents the amount Tony spends on single-ride passes in a month. Therefore, the sum $12.50g+1.50t$ represents the amount he spends on the two types of passes in a month. Since Tony spends a total of $80 on passes in a month, this expression can be set equal to 80, producing $12.50g+1.50t=80$.

Choices A and B are incorrect. The expression $g+t$ represents the total number of the two types of passes Tony buys in a month, not the amount Tony spends, which is equal to 80, nor the cost of one of each pass, which is equal to $1.50+12.50$. Choice C is incorrect and may result from reversing the cost for each type of pass Tony buys in a month.

Question Difficulty: Easy

Question ID 520e6f5b

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

ID: 520e6f5b

Characteristics for Rock Types

Rock type	Weight per volume (lb/ft^3)	Cost per pound
Basalt	180	$0.18
Granite	165	$0.09
Limestone	120	$0.03
Sandstone	135	$0.22

A city is planning to build a rock retaining wall, a monument, and a garden in a park. The table above shows four rock types that will be considered for use in the project. Also shown for each rock type is its weight per volume, in pounds per cubic foot (lb/ft^3), and the cost per pound, in dollars. The equation $0.03(120w)+0.18(180z)+3{,}385.80=7{,}576.20$ gives the total cost, in dollars, of the rocks used in the project in terms of the number of ft^3 of limestone, w, and the number of ft^3 of basalt, z. All four rock types are used in the project. Which of the following is the best interpretation of 3,385.80 in this context?

A. The cost of the granite and sandstone needed for the project

B. The cost of the basalt and limestone needed for the project

C. The cost of the basalt needed for the project

D. The cost of the sandstone needed for the project

ID: 520e6f5b Answer

Correct Answer: A

Rationale

Choice A is correct. The table shows the cost of limestone is $0.03/lb, and the weight per volume for limestone is 120 lb/ft^3. Therefore, the term $0.03(120w)$ represents the cost, in dollars, of w ft^3 of limestone. Similarly, the term $0.18(180z)$ represents the cost, in dollars, of z ft^3 of basalt. The given equation shows that the total cost of all the rocks used in the project is $7,576.20. Since it's given that all four rock types are used in the

project, the remaining term, 3,385.80, represents the cost, in dollars, of the granite and sandstone needed for the project.

Choice B is incorrect. The cost of basalt and limestone needed for the project can be represented by $0.18(180z)+0.03(120w)$. Choice C is incorrect. The cost of the basalt needed for the project can be represented by the expression $0.18(180z)$. Choice D is incorrect and may result from neglecting to include granite in the rock types used for the project.

Question Difficulty: Easy

Question ID b2de69bd

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

ID: b2de69bd

x	y
1	5
2	7
3	9
4	11

The table above shows some pairs of x values and y values. Which of the following equations could represent the relationship between x and y ?

A. $y = 2x + 3$

B. $y = 3x - 2$

C. $y = 4x - 1$

D. $y = 5x$

ID: b2de69bd Answer

Correct Answer: A

Rationale

Choice A is correct. Each of the choices is a linear equation in the form y = mx + b, where m and b are constants. In this equation, m represents the change in y for each increase in x by 1. From the table, it can be determined that the value of y increases by 2 for each increase in x by 1. In other words, for the pairs of x and y in the given table, m = 2. The value of b can be found by substituting the values of x and y from any row of the table and substituting the value of m into the equation y = mx + b and then solving for b. For example, using x = 1, y = 5, and m = 2 yields 5 = 2(1) + b. Solving for b yields b = 3. Therefore, the equation y = 2x + 3 could represent the relationship between x and y in the given table.

Alternatively, if an equation represents the relationship between x and y, then when each pair of x and y from the table is substituted into the equation, the result will be a true statement. Of the equations given, the equation y = 2x + 3 in choice A is the only equation that results in a true statement when each of the pairs of x and y are substituted into the equation.

Choices B, C, and D are incorrect because when at least one pair of x and y from the table is substituted into the equations given in these choices, the result is a false statement. For example, when the pair x = 4 and y = 11 is substituted into the equation in choice B, the result is 11 = 3(4) − 2, or 11 = 10, which is false.

Question ID c5479c1a

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

ID: c5479c1a

A shipment consists of 5-pound boxes and 10-pound boxes with a total weight of 220 pounds. There are 13 10-pound boxes in the shipment. How many 5-pound boxes are in the shipment?

A. 5

B. 10

C. 13

D. 18

ID: c5479c1a Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that the shipment consists of 5-pound boxes and 10-pound boxes with a total weight of 220 pounds. Let x represent the number of 5-pound boxes and y represent the number of 10-pound boxes in the shipment. Therefore, the equation $5x + 10y = 220$ represents this situation. It's given that there are 13 10-pound boxes in the shipment. Substituting 13 for y in the equation $5x + 10y = 220$ yields $5x + 10(13) = 220$, or $5x + 130 = 220$. Subtracting 130 from both sides of this equation yields $5x = 90$. Dividing both sides of this equation by 5 yields 18. Thus, there are 18 5-pound boxes in the shipment.

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. This is the number of 10-pound boxes in the shipment.

Question Difficulty: Easy

Question ID 1efd8202

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

ID: 1efd8202

$$y = 70x + 8$$

Which table gives three values of x and their corresponding values of y for the given equation?

A.

x	y
0	8
2	148
4	288

B.

x	y
0	70
2	78
4	86

C.

x	y
0	70
2	140
4	280

D.

x	y
0	8
2	132
4	272

ID: 1efd8202 Answer

Correct Answer: A

Rationale

Choice A is correct. Each of the given choices gives three values of x: 0, 2, and 4. Substituting 0 for x in the given equation yields $y = 70(0) + 8$, or $y = 8$. Therefore, when $x = 0$, the corresponding value of y for the given equation is 8. Substituting 2 for x in the given equation yields $y = 70(2) + 8$, or $y = 148$. Therefore, when $x = 2$, the corresponding value of y for the given equation is 148. Substituting 4 for x in the given

equation yields $y = 70(4) + 8$, or $y = 288$. Therefore, when $x = 4$, the corresponding value of y for the given equation is 288. Thus, if the three values of x are 0, 2, and 4, then their corresponding values of y are 8, 148, and 288, respectively, for the given equation.

Choice B is incorrect. This table gives three values of x and their corresponding values of y for the equation $y = 4x + 70$.

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: Easy

Question ID b9839f9e

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

ID: b9839f9e

$F = 2.50x + 7.00y$

In the equation above, *F* represents the total amount of money, in dollars, a food truck charges for *x* drinks and *y* salads. The price, in dollars, of each drink is the same, and the price, in dollars, of each salad is the same. Which of the following is the best interpretation for the number 7.00 in this context?

A. The price, in dollars, of one drink

B. The price, in dollars, of one salad

C. The number of drinks bought during the day

D. The number of salads bought during the day

ID: b9839f9e Answer

Correct Answer: B

Rationale

Choice B is correct. It's given that $2.50x + 7.00y$ is equal to the total amount of money, in dollars, a food truck charges for x drinks and y salads. Since each salad has the same price, it follows that the total charge for y salads is $7.00y$ dollars. When $y = 1$, the value of the expression $7.00y$ is 7.00×1, or 7.00. Therefore, the price for one salad is 7.00 dollars.

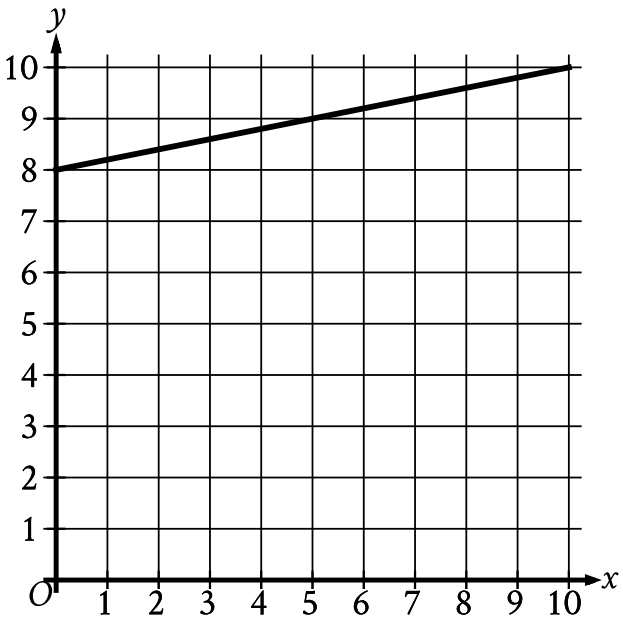
Choice A is incorrect. Since each drink has the same price, it follows that the total charge for x drinks is $2.50x$ dollars. Therefore, the price, in dollars, for one drink is 2.50, not 7.00. Choices C and D are incorrect. In the given equation, F represents the total charge, in dollars, when x drinks and y salads are bought at the food truck. No information is provided about the number of drinks or the number of salads that are bought during the day. Therefore, 7.00 doesn't represent either of these quantities.

Question Difficulty: Easy

Question ID f40552a9

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

ID: f40552a9



What is the y-intercept of the line graphed?

A. $(0, -8)$

B. $(0, -\frac{1}{8})$

C. $(0, 0)$

D. $(0, 8)$

ID: f40552a9 Answer

Correct Answer: D

Rationale

Choice D is correct. The y-intercept of a line graphed in the xy-plane is the point where the line intersects the y-axis. The line graphed intersects the y-axis at the point $(0, 8)$. Therefore, the y-intercept of the line graphed is $(0, 8)$.

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 ID 12ae3452

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

ID: 12ae3452

The equation $46 = 2a + 2b$ gives the relationship between the side lengths a and b of a certain parallelogram. If $a = 9$, what is the value of b?

ID: 12ae3452 Answer

Correct Answer: 14

Rationale

The correct answer is 14. It's given that the equation $46 = 2a + 2b$ gives the relationship between the side lengths a and b of a certain parallelogram. Substituting 9 for a in the given equation yields $46 = 2(9) + 2b$, or $46 = 18 + 2b$. Subtracting 18 from both sides of this equation yields $28 = 2b$. Dividing both sides of this equation by 2 yields $14 = b$. Therefore, if $a = 9$, the value of b is 14.

Question Difficulty: Easy

Question ID 8b2a2a63

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

ID: 8b2a2a63

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

ID: 8b2a2a63 Answer

Correct Answer: -32

Rationale

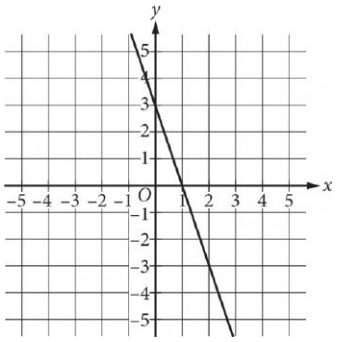
The correct answer is -32. It's given that the *y*-intercept of the graph of $y = -6x - 32$ is $(0, y)$. Substituting 0 for x in this equation yields $y = -6(0) - 32$, or $y = -32$. Therefore, the value of y that corresponds to the *y*-intercept of the graph of $y = -6x - 32$ in the *xy*-plane is -32.

Question Difficulty: Easy

Question ID 8a1544f1

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

ID: 8a1544f1



What is the equation of the line shown in the *xy*-plane above?

A. $y = 3x - 3$

B. $y = -3x + 3$

C. $y = \frac{1}{3}x - 3$

D. $y = -\frac{1}{3}x + 3$

ID: 8a1544f1 Answer

Correct Answer: B

Rationale

Choice B is correct. Any line in the xy-plane can be defined by an equation in the 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. From the graph, the y-intercept of the line is (0, 3). Therefore, b = 3. The slope of the line is the change in the value of y divided by the change in the value of x for any two points on the line. The line shown passes through (0, 3) and (1, 0), so $m = \frac{3 - 0}{0 - 1}$, or m = −3. Therefore, the equation of the line is y = −3x + 3.

Choices A and C are incorrect because the equations given in these choices represent a line with a positive slope. However, the line shown has a negative slope. Choice D is incorrect because the equation given in this choice represents a line with slope of $-\frac{1}{3}$. However, the line shown has a slope of −3.

Question Difficulty: Easy

Question ID 535fa6e6

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

ID: 535fa6e6

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: 535fa6e6 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 $0.69p + 0.99(2p) = 5.34$, 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 $c = 2(2)$, 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: Easy

Question ID 002dba45

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

ID: 002dba45

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: 002dba45 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 $\frac{-1}{-\frac{17}{3}}$, 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 9c7741c6

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

ID: 9c7741c6

On a 210-mile trip, Cameron drove at an average speed of 60 miles per hour for the first *x* hours. He then completed the trip, driving at an average speed of 50 miles per hour for the remaining *y* hours. If $x = 1$, what is the value of *y* ?

ID: 9c7741c6 Answer

Rationale

The correct answer is 3. It's given that Cameron drove 60 miles per hour for x hours; therefore, the distance driven at this speed can be represented by $60x$. He then drove 50 miles per hour for y hours; therefore, the distance driven at this speed can be represented by $50y$. Since Cameron drove 210 total miles, the equation $60x + 50y = 210$ represents this situation. If $x = 1$, substitution yields $60(1) + 50y = 210$, or $60 + 50y = 210$. Subtracting 60 from both sides of this equation yields $50y = 150$. Dividing both sides of this equation by 50 yields $y = 3$.

Question Difficulty: Medium

Question ID d62ad380

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

ID: d62ad380

An artist paints and sells square tiles. The selling price P, in dollars, of a painted tile is a linear function of the side length of the tile s, in inches, as shown in the table below.

Side length, s (inches)	Price, P (dollars)
3	8.00
6	18.00
9	28.00

Which of the following could define the relationship between s and P ?

A. $P = 3s + 10$

B. $P = \frac{10}{3}s + 8$

C. $P = \frac{10}{3}s - 2$

D. $P = \frac{3}{10}s - \frac{1}{10}$

ID: d62ad380 Answer

Correct Answer: C

Rationale

Choice C is correct. The relationship between s and P can be modeled by a linear equation of the form P = ks + a, where k and a are constants. The table shows that P increases by 10 when s increases by 3, so k = $\frac{10}{3}$. To solve for a, substitute one of the given pairs of values for s and P: when s = 3, P = 8, so $8 = \frac{10}{3}(3) + a$, which yields a = −2. The solution is therefore $P = \frac{10}{3}s - 2$.

Choice A is incorrect. When s = 3, P = 8, but 3(3) + 10 = 19 ≠ 8. Choice B is incorrect. This may result from using the first number given for P in the table as the constant term a in the linear equation $P = ks + a$, which is true only when s = 0. Choice D is incorrect and may result from using the reciprocal of the slope of the line.

Question Difficulty: Medium

Question ID 431c3038

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

ID: 431c3038

In an article about exercise, it is estimated that a 160-pound adult uses 200 calories for every 30 minutes of hiking and 150 calories for every 30 minutes of bicycling. An adult who weighs 160 pounds has completed 1 hour of bicycling. Based on the article, how many hours should the adult hike to use a total of 1,900 calories from bicycling and hiking?

A. 9.5

B. 8.75

C. 6

D. 4

ID: 431c3038 Answer

Correct Answer: D

Rationale

Choice D is correct. Since a 160-pound adult uses 200 calories for every 30 minutes of hiking, then the same adult uses $200h$ calories after hiking for h 30-minute periods. Similarly, the same adult uses $150b$ calories after bicycling for b 30-minute periods. Therefore, the equation $200h + 150b = 1{,}900$ represents the situation where a 160-pound adult uses a total of 1,900 calories from hiking for h 30-minute periods and bicycling for b 30-minute periods. It's given that the adult completes 1 hour, or 2 30-minute periods, of bicycling. Substituting 2 for b in the equation $200h + 150b = 1{,}900$ yields $200h + 150(2) = 1{,}900$, or $200h + 300 = 1{,}900$. Subtracting 300 from both sides of this equation yields $200h = 1{,}600$. Dividing both sides by 200 yields $h = 8$. Since h represents the number of 30-minute periods spent hiking and there are 2 30-minute periods in every hour, it follows that the adult will need to hike for $\frac{8}{2}$, or 4 hours to use a total of 1,900 calories from bicycling and hiking.

Choice A is incorrect and may result from solving the equation $200h = 1{,}900$. This represents 0 30-minute periods bicycling instead of 2. Choice B is incorrect and may result from solving the equation $200h + 150 = 1{,}900$. This represents 1 30-minute period of bicycling instead of 2. Choice C is incorrect. This may result from determining that the number of 30-minute periods the adult should hike is 8, but then subtracting 2 from 8, rather than dividing 8 by 2, to find the number of hours the adult should hike.

Question ID 265f2a53

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

ID: 265f2a53

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

A. $\frac{3}{344}$

B. $\frac{6}{43}$

C. $\frac{43}{6}$

D. $\frac{344}{3}$

ID: 265f2a53 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 $\left(0, \frac{86}{3}\right)$. 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 $\left(0, \frac{86}{3}\right)$ 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 $\left(\frac{86}{3}, 0\right)$ and a *y*-intercept of $(0, -4)$.

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

Question Difficulty: Medium

Question ID f81a0503

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

ID: f81a0503

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: f81a0503 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 28c2253f

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

ID: 28c2253f

Characteristics for Rock Types

Rock type	Weight per volume (lb/ft^3)	Cost per pound
Basalt	180	$0.18
Granite	165	$0.09
Limestone	120	$0.03
Sandstone	135	$0.22

A city is planning to build a rock retaining wall, a monument, and a garden in a park. The table above shows four rock types that will be considered for use in the project. Also shown for each rock type is its weight per volume, in pounds per cubic foot (lb/ft^3), and the cost per pound, in dollars. Only basalt, granite, and limestone will be used in the garden. The rocks in the garden will have a total weight of 1,000 pounds. If 330 pounds of granite is used, which of the following equations could show the relationship between the amounts, x and y, in ft^3, for each of the other rock types used?

A. $165x + 180y = 670$

B. $165x + 120y = 1{,}000$

C. $120x + 180y = 670$

D. $120x + 180y = 1{,}000$

ID: 28c2253f Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that the weight of the granite used in the garden is 330 pounds. The weight of the limestone used in the garden is a product of its weight per volume, in lb/ft^3, and its volume, in ft^3. Therefore, the weight of the limestone used in the garden can be represented by $120x$, where x is the volume, in ft^3, of the limestone used. Similarly, the weight of the basalt used in the garden can be represented by $180y$, where y

is the volume, in ft^3, of the basalt used. It's given that the total weight of the rocks used in the garden will be 1,000 pounds. Thus, the sum of the weights of the three rock types used is 1,000 pounds, which can be represented by the equation $120x + 180y + 330 = 1{,}000$. Subtracting 330 from both sides of this equation yields $120x + 180y = 670$.

Choice A is incorrect. This equation uses the weight per volume of granite instead of limestone. Choice B is incorrect. This equation uses the weight per volume of granite instead of basalt, and doesn't take into account the 330 pounds of granite that will be used in the garden. Choice D is incorrect. This equation doesn't take into account the 330 pounds of granite that will be used in the garden.

Question Difficulty: Medium

Question ID 2e1a7f66

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

ID: 2e1a7f66

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: 2e1a7f66 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 6f6dfe3e

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

ID: 6f6dfe3e

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: 6f6dfe3e 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 9ed4c1a2

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

ID: 9ed4c1a2

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

ID: 9ed4c1a2 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 fb43b85f

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

ID: fb43b85f

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

ID: fb43b85f 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 3cdbf026

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

ID: 3cdbf026

The graph of the equation $ax + ky = 6$ is a line in the *xy*-plane, where *a* and *k* are constants. If the line contains the points $(-2, -6)$ and $(0, -3)$, what is the value of *k* ?

A. -2

B. -1

C. 2

D. 3

ID: 3cdbf026 Answer

Correct Answer: A

Rationale

Choice A is correct. The value of k can be found using the slope-intercept form of a linear equation, $y = mx + b$, where m is the slope and b is the y-coordinate of the y-intercept. The equation $ax + ky = 6$ can be rewritten in the form $y = -\frac{a}{k}x + \frac{6}{k}$. One of the given points, $(0, -3)$, is the y-intercept. Thus, the y-coordinate of the y-intercept -3 must be equal to $\frac{6}{k}$. Multiplying both sides by k gives $-3k = 6$. Dividing both sides by -3 gives $k = -2$.

Choices B, C, and D are incorrect and may result from errors made rewriting the given equation.

Question Difficulty: Hard

Question ID fdee0fbf

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

ID: fdee0fbf

In the *xy*-plane, line *k* intersects the *y*-axis at the point $(0, -6)$ and passes through the point $(2, 2)$. If the point $(20, w)$ lies on line *k*, what is the value of *w* ?

ID: fdee0fbf Answer

Rationale

The correct answer is 74. The y-intercept of a line in the xy-plane is the ordered pair (x,y) of the point of intersection of the line with the y-axis. Since line k intersects the y-axis at the point $(0,-6)$, it follows that $(0,-6)$ is the y-intercept of this line. An equation of any line in the xy-plane can be written in the form $y=mx+b$, where m is the slope of the line and b is the y-coordinate of the y-intercept. Therefore, the equation of line k can be written as $y=mx+(-6)$, or $y=mx-6$. The value of m can be found by substituting the x- and y-coordinates from a point on the line, such as $(2,2)$, for x and y, respectively. This results in $2=2m-6$. Solving this equation for m gives $m=4$. Therefore, an equation of line k is $y=4x-6$. The value of w can be found by substituting the x-coordinate, 20, for x in the equation of line k and solving this equation for y. This gives $y=4(20)-6$, or $y=74$. Since w is the y-coordinate of this point, $w=74$.

Question Difficulty: Hard

Question ID 0b46bad5

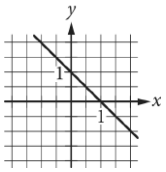
Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Linear equations in two variables	■■■

ID: 0b46bad5

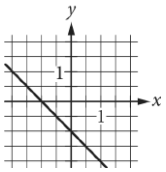
$ax + by = b$

In the equation above, *a* and *b* are constants and $0 < a < b$. Which of the following could represent the graph of the equation in the *xy*-plane?

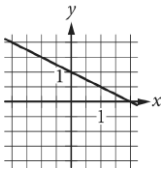
A.



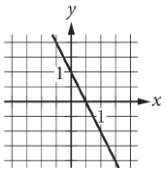
B.



C.



D.



ID: 0b46bad5 Answer

Correct Answer: C

Rationale

Choice C is correct. The given equation $ax + by = b$ can be rewritten in slope-intercept form, $y = mx + k$, where m represents the slope of the line represented by the equation, and k represents the y-coordinate of the y-intercept of the line. Subtracting ax from both sides of the equation yields $by = -ax + b$, and dividing both sides of this equation by b yields $y = -\frac{a}{b}x + \frac{b}{b}$, or $y = -\frac{a}{b}x + 1$. With the equation now in slope-intercept form, it shows that $k = 1$, which means the y-coordinate of the y-intercept is 1. It's given that a and b are both greater than 0 (positive) and that $a < b$. Since $m = -\frac{a}{b}$, the slope of the line must be a value between -1 and

0. Choice C is the only graph of a line that has a y-value of the y-intercept that is 1 and a slope that is between -1 and 0.

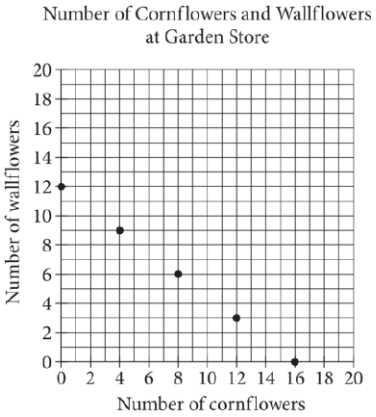
Choices A, B, and D are incorrect because the slopes of the lines in these graphs aren't between -1 and 0.

Question Difficulty: Hard

Question ID c362c210

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

ID: c362c210



The points plotted in the coordinate plane above represent the possible numbers of wallflowers and cornflowers that someone can buy at the Garden Store in order to spend exactly $24.00 total on the two types of flowers. The price of each wallflower is the same and the price of each cornflower is the same. What is the price, in dollars, of 1 cornflower?

ID: c362c210 Answer

Rationale

The correct answer is 1.5. The point $(16,0)$ corresponds to the situation where 16 cornflowers and 0 wallflowers are purchased. Since the total spent on the two types of flowers is $24.00, it follows that the price of 16 cornflowers is $24.00, and the price of one cornflower is $1.50. Note that 1.5 and 3/2 are examples of ways to enter a correct answer.

Question Difficulty: Hard

Question ID 98d3393a

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

ID: 98d3393a

Line ℓ in the *xy*-plane is perpendicular to the line with equation $x = 2$. What is the slope of line ℓ?

A. 0

B. $-\frac{1}{2}$

C. -2

D. The slope of line ℓ is undefined.

ID: 98d3393a Answer

Correct Answer: A

Rationale

Choice A is correct. It is given that line ℓ is perpendicular to a line whose equation is x = 2. A line whose equation is a constant value of x is vertical, so ℓ must therefore be horizontal. Horizontal lines have a slope of 0, so ℓ has a slope of 0.

Choice B is incorrect. A line with slope $-\frac{1}{2}$ is perpendicular to a line with slope 2. However, the line with equation x = 2 is vertical and has undefined slope (not slope of 2). Choice C is incorrect. A line with slope −2 is perpendicular to a line with slope $\frac{1}{2}$. However, the line with equation x = 2 has undefined slope (not slope of $\frac{1}{2}$). Choice D is incorrect; this is the slope of the line x = 2 itself, not the slope of a line perpendicular to it.

Question Difficulty: Hard

Question ID 0366d965

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

ID: 0366d965

x	*y*
3	7
k	11
12	*n*

The table above shows the coordinates of three points on a line in the *xy*-plane, where *k* and *n* are constants. If the slope of the line is 2, what is the value of $k+n$?

ID: 0366d965 Answer

Rationale

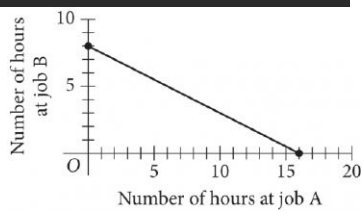
The correct answer is 30. The slope of a line can be found by using the slope formula, $\frac{y_2-y_1}{x_2-x_1}$. It's given that the slope of the line is 2; therefore, $\frac{y_2-y_1}{x_2-x_1}=2$. According to the table, the points $(3,7)$ and $(k,11)$ lie on the line. Substituting the coordinates of these points into the equation gives $\frac{11-7}{k-3}=2$. Multiplying both sides of this equation by $k-3$ gives $11-7=2(k-3)$, or $11-7=2k-6$. Solving for k gives $k=5$. According to the table, the points $(3,7)$ and $(12,n)$ also lie on the line. Substituting the coordinates of these points into $\frac{y_2-y_1}{x_2-x_1}=2$ gives $\frac{n-7}{12-3}=2$. Solving for n gives $n=25$. Therefore, $k+n=5+25$, or 30.

Question Difficulty: Hard

Question ID c4ea43ef

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

ID: c4ea43ef



To earn money for college, Avery works two part-time jobs: A and B. She earns $10 per hour working at job A and $20 per hour working at job B. In one week, Avery earned a total of *s* dollars for working at the two part-time jobs. The graph above represents all possible combinations of numbers of hours Avery could have worked at the two jobs to earn *s* dollars. What is the value of *s* ?

A. 128

B. 160

C. 200

D. 320

ID: c4ea43ef Answer

Correct Answer: B

Rationale

Choice B is correct. Avery earns $10 per hour working at job A. Therefore, if she works a hours at job A, she will earn $10a$ dollars. Avery earns $20 per hour working at job B. Therefore, if she works b hours at job B, she will earn $20b$ dollars. The graph shown represents all possible combinations of the number of hours Avery could have worked at the two jobs to earn s dollars. Therefore, if she worked a hours at job A, worked b hours at job B, and earned s dollars from both jobs, the following equation represents the graph: $10a+20b=s$, where s is a constant. Identifying any point (a,b) from the graph and substituting the values of the coordinates for a and b, respectively, in this equation yield the value of s. For example, the point $(16,0)$, where $a=16$ and $b=0$, lies on the graph. Substituting 16 for a and 0 for b in the equation $10a+20b=s$ yields $10(16)+20(0)=s$, or $160=s$. Similarly, the point $(0,8)$, where $a=0$ and $b=8$, lies on the graph. Substituting 0 for a and 8 for b in the equation $10a+20b=s$ yields $10(0)+20(8)=s$, or $160=s$.

Choices A, C, and D are incorrect. If the value of s is 128, 200, or 320, then no points (a,b) on the graph will satisfy this equation. For example, if the value of s is 128 (choice A), then the equation $10a+20b=s$ becomes

$10a + 20b = 128$. The point $(16,0)$, where $a = 16$ and $b = 0$, lies on the graph. However, substituting 16 for a and 0 for b in $10a + 20b = s$ yields $10(16) + 20(0) = 128$, or $160 = 128$, which is false. Therefore, $(16,0)$ doesn't satisfy the equation, and so the value of s can't be 128. Similarly, if $s = 200$ (choice C) or $s = 320$ (choice D), then substituting 16 for a and 0 for b yields $160 = 200$ and $160 = 320$, respectively, which are both false.

Question Difficulty: Hard

Question ID cb58833c

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

ID: cb58833c

The line with the equation $\frac{4}{5}x+\frac{1}{3}y=1$ is graphed in the *xy*-plane. What is the *x*-coordinate of the *x*-intercept of the line?

ID: cb58833c Answer

Rationale

The correct answer is 1.25. The y-coordinate of the x-intercept is 0, so 0 can be substituted for y, giving $\frac{4}{5}x+\frac{1}{3}(0)=1$. This simplifies to $\frac{4}{5}x=1$. Multiplying both sides of $\frac{4}{5}x=1$ by 5 gives $4x=5$. Dividing both sides of $4x=5$ by 4 gives $x=\frac{5}{4}$, which is equivalent to 1.25. Note that 1.25 and 5/4 are examples of ways to enter a correct answer.

Question Difficulty: Hard

Question ID a7a14e87

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

ID: a7a14e87

In the *xy*-plane, line *k* is defined by $x+y=0$. Line *j* is perpendicular to line *k*, and the *y*-intercept of line *j* is $(0,3)$. Which of the following is an equation of line *j* ?

A. $x+y=3$

B. $x+y=-3$

C. $x-y=3$

D. $x-y=-3$

ID: a7a14e87 Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that line j is perpendicular to line k and that line k is defined by the equation $x+y=0$. This equation can be rewritten in slope-intercept form, $y=mx+b$, where m represents the slope of the line and b represents the y-coordinate of the y-intercept of the line, by subtracting x from both sides of the equation, which yields $y=-x$. Thus, the slope of line k is -1. Since line j and line k are perpendicular, their slopes are opposite reciprocals of each other. Thus, the slope of line j is 1. It's given that the y-intercept of line j is $(0,3)$. Therefore, the equation for line j in slope-intercept form is $y=x+3$, which can be rewritten as $x-y=-3$.

Choices A, B, and C are incorrect and may result from conceptual or calculation errors.

Question Difficulty: Hard

Question ID a1fd2304

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

ID: a1fd2304

How many liters of a 25% saline solution must be added to 3 liters of a 10% saline solution to obtain a 15% saline solution?

ID: a1fd2304 Answer

Rationale

The correct answer is 1.5. The total amount, in liters, of a saline solution can be expressed as the liters of each type of saline solution multiplied by the percent concentration of the saline solution. This gives $3(0.10)$, $x(0.25)$, and $(x+3)(0.15)$, where x is the amount, in liters, of 25% saline solution and 10%, 15%, and 25% are represented as 0.10, 0.15, and 0.25, respectively. Thus, the equation $3(0.10)+0.25x=0.15(x+3)$ must be true. Multiplying 3 by 0.10 and distributing 0.15 to $(x+3)$ yields $0.30+0.25x=0.15x+0.45$. Subtracting 0.15x and 0.30 from each side of the equation gives $0.10x=0.15$. Dividing each side of the equation by 0.10 yields $x=1.5$. Note that 1.5 and 3/2 are examples of ways to enter a correct answer.

Question Difficulty: Hard