Question ID e056a89f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Systems of two linear equations in two variables	Easy

ID: e056a89f

$$x = 5$$
$$y = x - 8$$

Which of the following points (x, y) is the solution to the given system of equations in the *xy*-plane?

A. $(0, 0)$

B. $(5, -3)$

C. $(5, -8)$

D. $(5, 8)$

ID: e056a89f Answer

Correct Answer: B

Rationale

Choice B is correct. A solution to a system of equations in the *xy*-plane is a point (x, y) that lies on the graph of each equation in the system. The first equation given is $x = 5$. Substituting 5 for x in the second given equation yields $y = 5 - 8$, or $y = -3$. It follows that in the *xy*-plane, the point $(5, -3)$ lies on the graph of each equation in the system. Therefore, the solution to the given system of equations in the *xy*-plane is $(5, -3)$.

Choice A is incorrect. The point $(0, 0)$ doesn't lie on the graph of either equation in the given system.

Choice C is incorrect. The point $(5, -8)$ doesn't lie on the graph of the second equation in the given system.

Choice D is incorrect. The point $(5, 8)$ doesn't lie on the graph of the second equation in the given system.

Question Difficulty: Easy

Question ID e13b9cac

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Systems of two linear equations in two variables	Medium

ID: e13b9cac

$$6x + 7y = 28$$
$$2x + 2y = 10$$

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

A. -2

B. 7

C. 14

D. 18

ID: e13b9cac Answer

Correct Answer: A

Rationale

Choice A is correct. The given system of linear equations can be solved by the elimination method. Multiplying each side of the second equation in the given system by 3 yields $(2x + 2y)(3) = (10)(3)$, or $6x + 6y = 30$. Subtracting this equation from the first equation in the given system yields $(6x + 7y) - (6x + 6y) = (28) - (30)$, which is equivalent to $(6x - 6x) + (7y - 6y) = 28 - 30$, or $y = -2$.

Choice B is incorrect. This is the value of x, not the value of y.

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 b0e72232

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Systems of two linear equations in two variables	Hard

ID: b0e72232

$$3x = 36y - 45$$

One of the two equations in a system of linear equations is given. The system has no solution. Which equation could be the second equation in this system?

A. $x = 4y$

B. $\frac{1}{3}x = 4y$

C. $x = 12y - 15$

D. $\frac{1}{3}x = 12y - 15$

ID: b0e72232 Answer

Correct Answer: B

Rationale

Choice B is correct. A system of two linear equations in two variables, x and y, has no solution when the lines in the *xy*-plane representing the equations are parallel and distinct. Two lines are parallel and distinct if their slopes are the same and their *y*-intercepts are different. The slope of the graph of the given equation, $3x = 36y - 45$, in the *xy*-plane can be found by rewriting the equation in the form $y = mx + b$, where m is the slope of the graph and $(0, b)$ is the *y*-intercept. Adding 45 to each side of the given equation yields $3x + 45 = 36y$. Dividing each side of this equation by 36 yields $\frac{1}{12}x + \frac{5}{4} = y$, or $y = \frac{1}{12}x + \frac{5}{4}$. It follows that the slope of the graph of the given equation is $\frac{1}{12}$ and the *y*-intercept is $\left(0, \frac{5}{4}\right)$. Therefore, the graph of the second equation in the system must also have a slope of $\frac{1}{12}$, but must not have a *y*-intercept of $\left(0, \frac{5}{4}\right)$. Multiplying each side of the equation given in choice B by $\frac{1}{4}$ yields $\frac{1}{12}x = y$, or $y = \frac{1}{12}x$. It follows that the graph representing the equation in choice B has a slope of $\frac{1}{12}$ and a *y*-intercept of $(0, 0)$. Since the slopes of the graphs of the two equations are equal and the *y*-intercepts of the graphs of the two equations are different, the equation in choice B could be the second equation in the system.

Choice A is incorrect. This equation can be rewritten as $y = \frac{1}{4}x$. It follows that the graph of this equation has a slope of $\frac{1}{4}$, so the system consisting of this equation and the given equation has exactly one solution, rather than no solution.

Choice C is incorrect. This equation can be rewritten as $y = \frac{1}{12}x + \frac{5}{4}$. It follows that the graph of this equation has a slope of $\frac{1}{12}$ and a *y*-intercept of $\left(0, \frac{5}{4}\right)$, so the system consisting of this equation and the given equation has infinitely many solutions, rather than no solution.

Choice D is incorrect. This equation can be rewritten as $y = \frac{1}{36}x + \frac{5}{4}$. It follows that the graph of this equation has a slope of $\frac{1}{36}$, so the system consisting of this equation and the given equation has exactly one solution, rather than no solution.

Question Difficulty: Hard

Question ID 96325aa9

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Systems of two linear equations in two variables	Easy

ID: 96325aa9

$$4x = 20$$
$$-3x + y = -7$$

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

A. -27

B. -13

C. 13

D. 27

ID: 96325aa9 Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that $4x = 20$ and $-3x + y = -7$ is a system of equations with a solution (x, y). Adding the second equation in the given system to the first equation yields $4x + (-3x + y) = 20 + (-7)$, which is equivalent to $x + y = 13$. Thus, the value of $x + y$ is 13.

Choice A is incorrect. This represents the value of $-2(x + y) - 1$.

Choice B is incorrect. This represents the value of $-(x + y)$.

Choice D is incorrect. This represents the value of $2(x + y) + 1$.

Question Difficulty: Easy

Question ID 89ad6f07

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Systems of two linear equations in two variables	Medium

ID: 89ad6f07

$$3x + 6 = 4y$$
$$3x + 4 = 2y$$

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

ID: 89ad6f07 Answer

Correct Answer: 1

Rationale

The correct answer is 1. Subtracting the second equation from the first equation in the given system of equations yields $(3x - 3x) + (6 - 4) = 4y - 2y$, which is equivalent to $0 + 2 = 2y$, or $2 = 2y$. Dividing each side of this equation by 2 yields $1 = y$.

Question Difficulty: Medium

Question ID 90c618a3

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Systems of two linear equations in two variables	Hard

ID: 90c618a3

$$4x - 6y = 10y + 2$$
$$ty = \frac{1}{2} + 2x$$

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

ID: 90c618a3 Answer

Correct Answer: 8

Rationale

The correct answer is 8. The given system of equations can be solved using the elimination method. Multiplying both sides of the second equation in the given system by -2 yields $-2ty = -1 - 4x$, or $-1 - 4x = -2ty$. Adding this equation to the first equation in the given system, $4x - 6y = 10y + 2$, yields $(4x - 6y) + (-1 - 4x) = (10y + 2) + (-2ty)$, or $-1 - 6y = 10y - 2ty + 2$. Subtracting $10y$ from both sides of this equation yields $(-1 - 6y) - (10y) = (10y - 2ty + 2) - (10y)$, or $-1 - 16y = -2ty + 2$. If the given system has no solution, then the equation $-1 - 16y = -2ty + 2$ has no solution. If this equation has no solution, the coefficients of y on each side of the equation, -16 and $-2t$, must be equal, which yields the equation $-16 = -2t$. Dividing both sides of this equation by -2 yields $8 = t$. Thus, if the system has no solution, the value of t is 8.

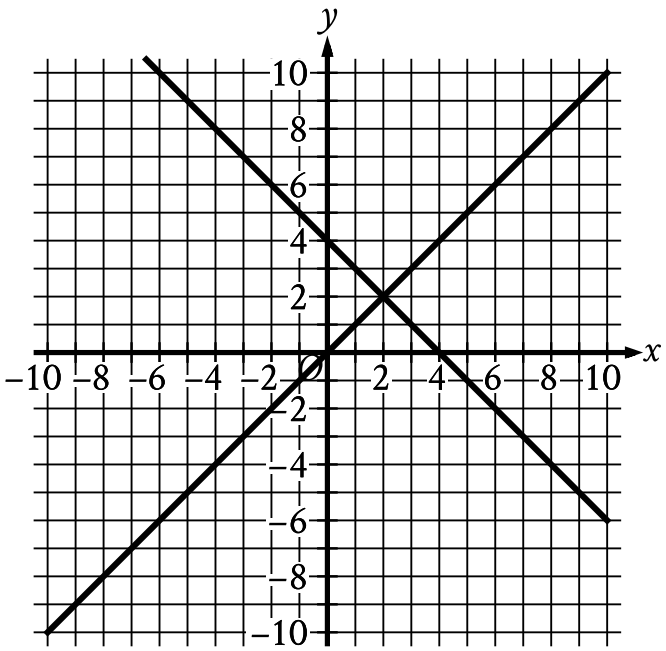
Alternate approach: A system of two linear equations in two variables, x and y, has no solution if the lines represented by the equations in the xy-plane are parallel and distinct. Lines represented by equations in the form $Ax + By = C$, where A, B, and C are constant terms, are parallel if the ratio of the x-coefficients is equal to the ratio of the y-coefficients, and distinct if the ratio of the x-coefficients are not equal to the ratio of the constant terms. Subtracting $10y$ from both sides of the first equation in the given system yields $(4x - 6y) - (10y) = (10y + 2) - (10y)$, or $4x - 16y = 2$. Subtracting $2x$ from both sides of the second equation in the given system yields $(ty) - (2x) = \left(\frac{1}{2} + 2x\right) - (2x)$, or $-2x + ty = \frac{1}{2}$. The ratio of the x-coefficients for these equations is $-\frac{2}{4}$, or $-\frac{1}{2}$. The ratio of the y-coefficients for these equations is $-\frac{t}{16}$. The ratio of the constant terms for these equations is $\frac{1/2}{2}$, or $\frac{1}{4}$. Since the ratio of the x-coefficients, $-\frac{1}{2}$, is not equal to the ratio of the constants, $\frac{1}{4}$, the lines represented by the equations are distinct. Setting the ratio of the x-coefficients equal to the ratio of the y-coefficients yields $-\frac{1}{2} = -\frac{t}{16}$. Multiplying both sides of this equation by -16 yields $\left(-\frac{1}{2}\right)(-16) = \left(-\frac{t}{16}\right)(-16)$, or $t = 8$. Therefore, when $t = 8$, the lines represented by these equations are parallel. Thus, if the system has no solution, the value of t is 8.

Question Difficulty: Hard

Question ID 6db418b9

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Systems of two linear equations in two variables	Easy

ID: 6db418b9



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

A. $(0, 4)$

B. $(2, 2)$

C. $(4, 0)$

D. $(4, 4)$

ID: 6db418b9 Answer

Correct Answer: B

Rationale

Choice B is correct. The solution to this system of linear equations is represented by the point that lies on both lines shown, or the point of intersection of the two lines. According to the graph, the point of intersection occurs when $x = 2$ and $y = 2$, or at the point $(2, 2)$. Therefore, the solution (x, y) to the system is $(2, 2)$.

Choice A 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 9843892f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Systems of two linear equations in two variables	Medium

ID: 9843892f

$$3y = 4x + 17$$
$$-3y = 9x - 23$$

The solution to the given system of equations is (x, y). What is the value of $39x$?

A. -18

B. -6

C. 6

D. 18

ID: 9843892f Answer

Correct Answer: D

Rationale

Choice D is correct. Adding the second equation to the first equation in the given system of equations yields $3y - 3y = 4x + 9x + 17 - 23$, or $0 = 13x - 6$. Adding 6 to each side of this equation yields $6 = 13x$. Multiplying each side of this equation by 3 yields $18 = 39x$. Therefore, the value of $39x$ is 18.

Choice A is incorrect. This is the value of $-39x$, not $39x$.

Choice B is incorrect. This is the value of $-13x$, not $39x$.

Choice C is incorrect. This is the value of $13x$, not $39x$.

Question Difficulty: Medium

Question ID 8f9ba995

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Systems of two linear equations in two variables	Hard

ID: 8f9ba995

$$-12x + 14y = 36$$
$$-6x + 7y = -18$$

How many solutions does the given system of equations have?

A. Exactly one

B. Exactly two

C. Infinitely many

D. Zero

ID: 8f9ba995 Answer

Correct Answer: D

Rationale

Choice D is correct. A system of two linear equations in two variables, x and y, has zero solutions if the lines representing the equations in the *xy*-plane are distinct and parallel. Two lines are distinct and parallel if they have the same slope but different *y*-intercepts. Each equation in the given system can be written in slope-intercept form $y = mx + b$, where m is the slope of the line representing the equation in the *xy*-plane and $(0, b)$ is the *y*-intercept. Adding $12x$ to both sides of the first equation in the given system of equations, $-12x + 14y = 36$, yields $14y = 12x + 36$. Dividing both sides of this equation by 14 yields $y = \frac{6}{7}x + \frac{18}{7}$. It follows that the first equation in the given system of equations has a slope of $\frac{6}{7}$ and a *y*-intercept of $\left(0, \frac{18}{7}\right)$. Adding $6x$ to both sides of the second equation in the given system of equations, $-6x + 7y = -18$, yields $7y = 6x - 18$. Dividing both sides of this equation by 7 yields $y = \frac{6}{7}x - \frac{18}{7}$. It follows that the second equation in the given system of equations has a slope of $\frac{6}{7}$ and a *y*-intercept of $\left(0, -\frac{18}{7}\right)$. Since the slopes of these lines are the same and the *y*-intercepts are different, it follows that the given system of equations has zero solutions.

Alternate approach: To solve the system by elimination, multiplying the second equation in the given system of equations, $-6x + 7y = -18$, by -2 yields $12x - 14y = 36$. Adding this equation to the first equation in the given system of equations, $-12x + 14y = 36$, yields $(-12x + 12x) + (-14y + 14y) = 36 + 36$, or $0 = 72$. Since this equation isn't true, the given system of equations has zero solutions.

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: Hard

Question ID 1605a215

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Systems of two linear equations in two variables	Easy

ID: 1605a215

$$x = 8$$
$$x + 3y = 26$$

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

ID: 1605a215 Answer

Correct Answer: 6

Rationale

The correct answer is 6. The first equation in the given system is $x = 8$. Substituting 8 for x in the second equation in the given system yields $8 + 3y = 26$. Subtracting 8 from both sides of this equation yields $3y = 18$. Dividing both sides of this equation by 3 yields $y = 6$. Therefore, the value of y is 6.

Question Difficulty: Easy

Question ID d79caaad

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Systems of two linear equations in two variables	Medium

ID: d79caaad

The combined original price for a mirror and a vase is $\$60$. After a 25% discount to the mirror and a 45% discount to the vase are applied, the combined sale price for the two items is $\$39$. Which system of equations gives the original price m, in dollars, of the mirror and the original price v, in dollars, of the vase?

A. $m + v = 60$
$0.55m + 0.75v = 39$

B. $m + v = 60$
$0.45m + 0.25v = 39$

C. $m + v = 60$
$0.75m + 0.55v = 39$

D. $m + v = 60$
$0.25m + 0.45v = 39$

ID: d79caaad Answer

Correct Answer: C

Rationale

Choice C is correct. It's given that m represents the original price, in dollars, of the mirror, and v represents the original price, in dollars, of the vase. It's also given that the combined original price for the mirror and the vase is $\$60$. This can be represented by the equation $m + v = 60$. After a 25% discount to the mirror is applied, the sale price of the mirror is 75% of its original price. This can be represented by the expression $0.75m$. After a 45% discount to the vase is applied, the sale price of the vase is 55% of its original price. This can be represented by the expression $0.55v$. It's given that the combined sale price for the two items is $\$39$. This can be represented by the equation $0.75m + 0.55v = 39$. Therefore, the system of equations consisting of the equations $m + v = 60$ and $0.75m + 0.55v = 39$ gives the original price m, in dollars, of the mirror and the original price v, in dollars, of the vase.

Choice A is incorrect. The second equation in this system of equations represents a 45% discount to the mirror and a 25% discount to the vase.

Choice B is incorrect. The second equation in this system of equations represents a 55% discount to the mirror and a 75% discount to the vase.

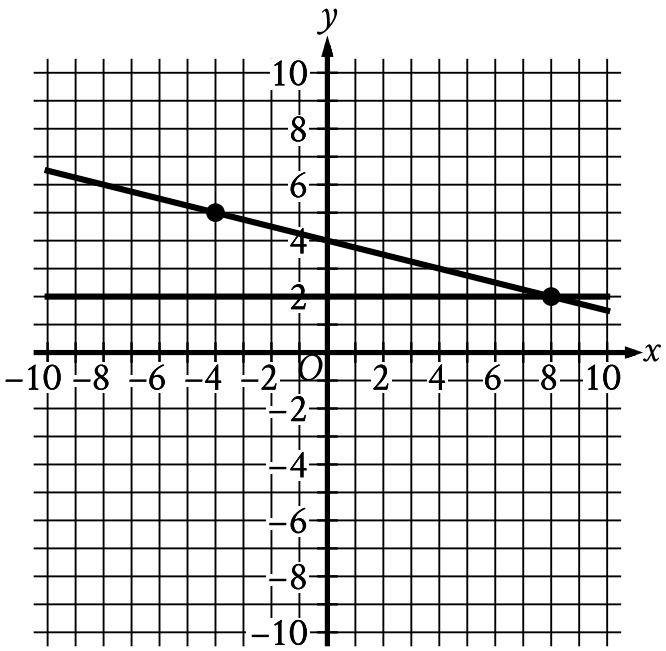
Choice D is incorrect. The second equation in this system of equations represents a 75% discount to the mirror and a 55% discount to the vase.

Question Difficulty: Medium

Question ID 0b28166c

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Systems of two linear equations in two variables	Hard

ID: 0b28166c



If a new graph of three linear equations is created using the system of equations shown and the equation $x + 4y = -16$, how many solutions (x, y) will the resulting system of three equations have?

A. Zero

B. Exactly one

C. Exactly two

D. Infinitely many

ID: 0b28166c Answer

Correct Answer: A

Rationale

Choice A is correct. A solution to a system of equations must satisfy each equation in the system. It follows that if an ordered pair (x, y) is a solution to the system, the point (x, y) lies on the graph in the *xy*-plane of each equation in the system. The only point that lies on each graph of the system of two linear equations shown is their intersection point $(8, 2)$. It follows that if a new graph of three linear equations is created using the system of equations shown and the graph of $x + 4y = -16$, this system has either zero solutions or one solution, the point $(8, 2)$. Substituting 8 for x and 2 for y in the

equation $x + 4y = -16$ yields $8 + 4(2) = -16$, or $16 = -16$. Since this equation is not true, the point $(8, 2)$ does not lie on the graph of $x + 4y = -16$. Therefore, $(8, 2)$ is not a solution to the system of three equations. It follows that there are zero solutions to this system.

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: Hard

Question ID b84c49da

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Systems of two linear equations in two variables	Easy

ID: b84c49da

$$y = 12x - 20$$
$$y = 28$$

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

A. $(4, 28)$

B. $(20, 28)$

C. $(28, 4)$

D. $(28, 20)$

ID: b84c49da Answer

Correct Answer: A

Rationale

Choice A is correct. The second equation in the given system is $y = 28$. Substituting 28 for y in the first equation in the given system yields $28 = 12x - 20$. Adding 20 to both sides of this equation yields $48 = 12x$. Dividing both sides of this equation by 12 yields $4 = x$. Therefore, the solution (x, y) to the given system of equations is $(4, 28)$.

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

Choice C is incorrect. This is the solution (y, x), not (x, y), to the given system of equations.

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

Question Difficulty: Easy

Question ID f637b1a9

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Systems of two linear equations in two variables	Medium

ID: f637b1a9

A bus traveled on the highway and on local roads to complete a trip of 160 miles. The trip took 4 hours. The bus traveled at an average speed of 55 miles per hour (mph) on the highway and an average speed of 25 mph on local roads. If x is the time, in hours, the bus traveled on the highway and y is the time, in hours, it traveled on local roads, which system of equations represents this situation?

A. $55x + 25y = 4$
$x + y = 160$

B. $55x + 25y = 160$
$x + y = 4$

C. $25x + 55y = 4$
$x + y = 160$

D. $25x + 55y = 160$
$x + y = 4$

ID: f637b1a9 Answer

Correct Answer: B

Rationale

Choice B is correct. If the bus traveled at an average speed of 55 miles per hour (mph) on the highway for x hours, then the bus traveled $55x$ miles on the highway. If the bus traveled at an average speed of 25 mph on local roads for y hours, then the bus traveled $25y$ miles on local roads. It's given that the trip was 160 miles. This can be represented by the equation $55x + 25y = 160$. It's also given that the trip took 4 hours. This can be represented by the equation $x + y = 4$. Therefore, the system consisting of the equations $55x + 25y = 160$ and $x + y = 4$ represents this situation.

Choice A is incorrect. This system of equations represents a situation where the trip was 4 miles and took 160 hours.

Choice C is incorrect. This system of equations represents a situation where the trip was 4 miles and took 160 hours, and the bus traveled at an average speed of 25 mph on the highway and 55 mph on local roads.

Choice D is incorrect. This system of equations represents a situation where the bus traveled at an average speed of 25 mph on the highway and 55 mph on local roads.

Question Difficulty: Medium

Question ID 3eb27778

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Systems of two linear equations in two variables	Hard

ID: 3eb27778

Store A sells raspberries for $\$5.50$ per pint and blackberries for $\$3.00$ per pint. Store B sells raspberries for $\$6.50$ per pint and blackberries for $\$8.00$ per pint. A certain purchase of raspberries and blackberries would cost $\$37.00$ at Store A or $\$66.00$ at Store B. How many pints of blackberries are in this purchase?

A. 4

B. 5

C. 8

D. 12

ID: 3eb27778 Answer

Correct Answer: B

Rationale

Choice C is correct. It's given that store A sells raspberries for $\$5.50$ per pint and blackberries for $\$3.00$ per pint, and a certain purchase of raspberries and blackberries at store A would cost $\$37.00$. It's also given that store B sells raspberries for $\$6.50$ per pint and blackberries for $\$8.00$ per pint, and this purchase of raspberries and blackberries at store B would cost $\$66.00$. Let r represent the number of pints of raspberries and b represent the number of pints of blackberries in this purchase. The equation $5.50r + 3.00b = 37.00$ represents this purchase of raspberries and blackberries from store A and the equation $6.50r + 8.00b = 66.00$ represents this purchase of raspberries and blackberries from store B. Solving the system of equations by elimination gives the value of r and the value of b that make the system of equations true. Multiplying both sides of the equation for store A by 6.5 yields $(5.50r)(6.5) + (3.00b)(6.5) = (37.00)(6.5)$, or $35.75r + 19.5b = 240.5$. Multiplying both sides of the equation for store B by 5.5 yields $(6.50r)(5.5) + (8.00b)(5.5) = (66.00)(5.5)$, or $35.75r + 44b = 363$. Subtracting both sides of the equation for store A, $35.75r + 19.5b = 240.5$, from the corresponding sides of the equation for store B, $35.75r + 44b = 363$, yields $(35.75r - 35.75r) + (44b - 19.5b) = (363 - 240.5)$, or $24.5b = 122.5$. Dividing both sides of this equationby 24.5 yields $b = 5$. Thus, 5 pints of blackberries are in this purchase.

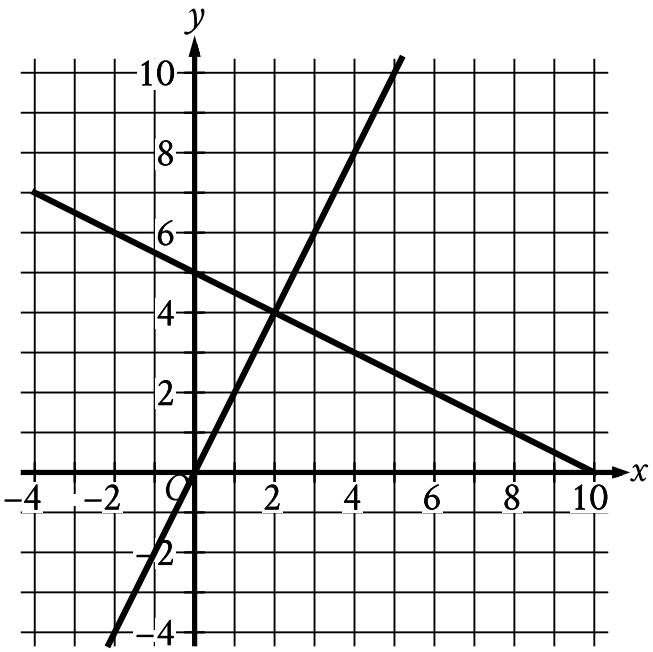
Choices A and B are incorrect and may result from conceptual or calculation errors. Choice D is incorrect. This is the number of pints of raspberries, not blackberries, in the purchase.

Question Difficulty: Hard

Question ID 773184de

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Systems of two linear equations in two variables	Easy

ID: 773184de



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

A. $(0, 5)$

B. $(2, 4)$

C. $(5, 10)$

D. $(10, 0)$

ID: 773184de Answer

Correct Answer: B

Rationale

Choice B is correct. A solution to a system of equations must be the solution to each equation in the system. It follows that if (x, y) is a solution to the system, the point (x, y) lies on the graph in the *xy*-plane of each equation in the system. The point that lies on each graph of the system of linear equations shown is their intersection point $(2, 4)$. Therefore, the solution to the system is $(2, 4)$.

Choice A is incorrect. The point $(0, 5)$ lies on one, but not both, of the graphs of the linear equations shown.

Choice C is incorrect. The point $(5, 10)$ lies on one, but not both, of the graphs of the linear equations shown.

Choice D is incorrect. The point $(10, 0)$ lies on one, but not both, of the graphs of the linear equations shown.

Question Difficulty: Easy

Question ID 670da52f

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Systems of two linear equations in two variables	Medium

ID: 670da52f

$$y = 6x + 3$$

One of the two equations in a system of linear equations is given. The system has infinitely many solutions. Which equation could be the second equation in this system?

A. $y = 2(6x) + 3$

B. $y = 2(6x + 3)$

C. $2(y) = 2(6x) + 3$

D. $2(y) = 2(6x + 3)$

ID: 670da52f Answer

Correct Answer: D

Rationale

Choice D is correct. It's given that the system has infinitely many solutions. A system of two linear equations has infinitely many solutions when the two linear equations are equivalent. When one equation is a multiple of another equation, the two equations are equivalent. Multiplying each side of the given equation by 2 yields $2(y) = 2(6x + 3)$. Thus, $2(y) = 2(6x + 3)$ is equivalent to the given equation and could be the second equation in the system.

Choice A is incorrect. The system consisting of this equation and the given equation has one solution rather than infinitely many solutions.

Choice B is incorrect. The system consisting of this equation and the given equation has one solution rather than infinitely many solutions.

Choice C is incorrect. The system consisting of this equation and the given equation has no solutions rather than infinitely many solutions.

Question Difficulty: Medium

Question ID 5cf2a640

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Algebra	Systems of two linear equations in two variables	Hard

ID: 5cf2a640

$$7x + 6y = 5$$
$$28x + 24y = 20$$

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

A. $(r, -\frac{6r}{7} + \frac{5}{7})$

B. $(r, \frac{7r}{6} + \frac{5}{6})$

C. $(\frac{r}{4} + 5, -\frac{r}{4} + 20)$

D. $(-\frac{6r}{7} + \frac{5}{7}, r)$

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Correct Answer: D

Rationale

Choice D is correct. Dividing each side of the second equation in the given system by 4 yields $7x + 6y = 5$. It follows that the two equations in the given system are equivalent and any point that lies on the graph of one equation will also lie on the graph of the other equation. Substituting r for y in the equation $7x + 6y = 5$ yields $7x + 6r = 5$. Subtracting $6r$ from each side of this equation yields $7x = -6r + 5$. Dividing each side of this equation by 7 yields $x = -\frac{6r}{7} + \frac{5}{7}$. Therefore, the point $(-\frac{6r}{7} + \frac{5}{7}, r)$ lies on the graph of each equation in the *xy*-plane for each real number r.

Choice A is incorrect. Substituting r for x in the equation $7x + 6y = 5$ yields $7r + 6y = 5$. Subtracting $7r$ from each side of this equation yields $6y = -7r + 5$. Dividing each side of this equation by 6 yields $y = -\frac{7r}{6} + \frac{5}{6}$. Therefore, the point $(r, -\frac{7r}{6} + \frac{5}{6})$, not the point $(r, -\frac{6r}{7} + \frac{5}{7})$, lies on the graph of each equation.

Choice B is incorrect. Substituting r for x in the equation $7x + 6y = 5$ yields $7r + 6y = 5$. Subtracting $7r$ from each side of this equation yields $6y = -7r + 5$. Dividing each side of this equation by 6 yields $y = -\frac{7r}{6} + \frac{5}{6}$. Therefore, the point $(r, -\frac{7r}{6} + \frac{5}{6})$, not the point $(r, \frac{7r}{6} + \frac{5}{6})$, lies on the graph of each equation.

Choice C is incorrect. Substituting $\frac{r}{4} + 5$ for x in the equation $7x + 6y = 5$ yields $7(\frac{r}{4} + 5) + 6y = 5$, or $(\frac{7r}{4} + 35) + 6y = 5$. Subtracting $(\frac{7r}{4} + 35)$ from each side of this equation yields $6y = -\frac{7r}{4} - 35 + 5$, or $6y = -\frac{7r}{4} - 30$. Dividing each side of this equation by 6 yields $y = -\frac{7r}{24} - 5$. Therefore, the point $(\frac{r}{4} + 5, -\frac{7r}{24} - 5)$, not the point $(\frac{r}{4} + 5, -\frac{r}{4} + 20)$, lies on the graph of each equation.

Question Difficulty: Hard