Question ID 3c95093c

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	■ □ □

$$6x - 9y > 12$$

Which of the following inequalities is equivalent to the inequality above?

A. $x - y > 2$

B. $2x - 3y > 4$

C. $3x - 2y > 4$

D. $3y - 2x > 2$

Correct Answer: B

Rationale

Choice B is correct. Both sides of the given inequality can be divided by 3 to yield $2x - 3y > 4$.

Choices A, C, and D are incorrect because they are not equivalent to (do not have the same solution set as) the given inequality. For example, the ordered pair $(0, -1.5)$ is a solution to the given inequality, but it is not a solution to any of the inequalities in choices A, C, or D.

Question Difficulty: Easy

Question ID 1e003284

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	■□□

ID: 1e003284

$$x = 49$$
$$y = \sqrt{x} + 9$$

The graphs of the given equations intersect at the point (x, y) in the xy-plane. What is the value of y?

A. 16

B. 40

C. 81

D. 130

ID: 1e003284 Answer

Correct Answer: A

Rationale

Choice A is correct. It's given that the graphs of the given equations intersect at the point x, y in the xy-plane. It follows that x, y represents a solution to the system consisting of the given equations. The first equation given is $x = 49$. Substituting 49 for x in the second equation given, $y = \sqrt{x} + 9$, yields $y = \sqrt{49} + 9$, which is equivalent to $y = 7 + 9$, or $y = 16$. It follows that the graphs of the given equations intersect at the point $49, 16$. Therefore, the value of y is 16.

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 ad03127d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	■□□

ID: ad03127d

$$6r = 7s + t$$

The given equation relates the variables r, s, and t. Which equation correctly expresses s in terms of r and t?

A. $s = 42r - t$

B. $s = 7(6r - t)$

C. $s = \frac{6}{7}r - t$

D. $s = \frac{6r - t}{7}$

ID: ad03127d Answer

Correct Answer: D

Rationale

Choice D is correct. Subtracting t from both sides of the given equation yields $6r - t = 7s$. Dividing both sides of this equation by 7 yields $\frac{6r - t}{7} = s$. Therefore, the equation $s = \frac{6r - t}{7}$ correctly expresses s in terms of r and t.

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

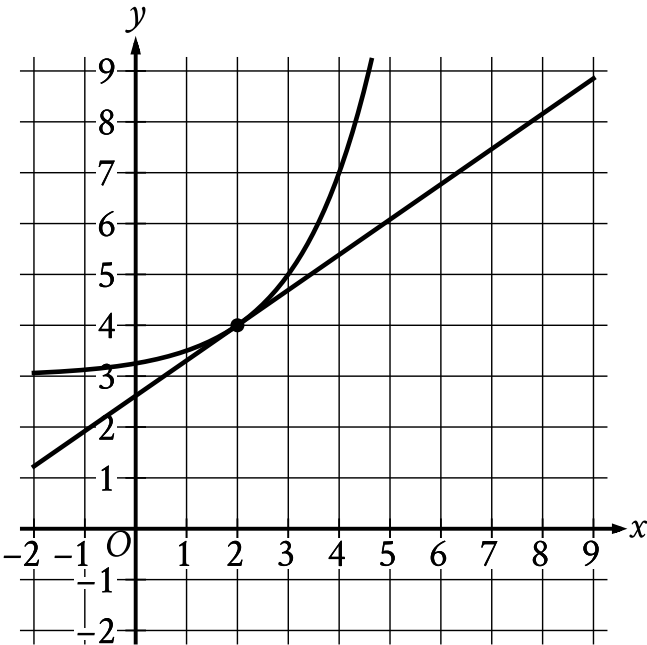Choice B is incorrect and may result from conceptual or calculation errors.

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

Question Difficulty: Easy

Question ID 4ca30186

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	■ □ □

ID: 4ca30186

The graph of a system of a linear equation and a nonlinear equation is shown. What is the solution (x, y) to this system?

A. $(0, 0)$

B. $(0, 2)$

C. $(2, 4)$

D. $(4, 0)$

ID: 4ca30186 Answer

Correct Answer: C

Rationale

Choice C is correct. The solution to the system of two equations corresponds to the point where the graphs of the equations intersect. The graphs of the linear equation and the nonlinear equation shown intersect at the point $2, 4$. Thus, the solution to the system is $2, 4$.

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

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

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

Question Difficulty: Easy

Question ID 3de7a7d7

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	■□□

ID: 3de7a7d7

Which of the following is a solution to the equation $2x^2 - 4 = x^2$?

A. 1

B. 2

C. 3

D. 4

ID: 3de7a7d7 Answer

Correct Answer: B

Rationale

Choice B is correct. Subtracting x^2 from both sides of the given equation yields $x^2 - 4 = 0$. Adding 4 to both sides of the equation gives $x^2 = 4$. Taking the square root of both sides of the equation gives $x = 2$ or $x = -2$. Therefore, $x = 2$ is one solution to the original equation.

Alternative approach: Subtracting x^2 from both sides of the given equation yields $x^2 - 4 = 0$. Factoring this equation gives $x^2 - 4 = (x + 2)(x - 2) = 0$, such that $x = 2$ or $x = -2$. Therefore, $x = 2$ is one solution to the original equation.

Choices A, C, and D are incorrect and may be the result of computation errors.

Question Difficulty: Easy

Question ID 70f98ab4

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	■□□

ID: 70f98ab4

$$q - 29r = s$$

The given equation relates the positive numbers q, r, and s. Which equation correctly expresses q in terms of r and s?

A. $q = s - 29r$

B. $q = s + 29r$

C. $q = 29rs$

D. $q = -\frac{s}{29r}$

ID: 70f98ab4 Answer

Correct Answer: B

Rationale

Choice B is correct. Adding $29r$ to each side of the given equation yields $q = s + 29r$. Therefore, the equation $q = s + 29r$ correctly expresses q in terms of r and s.

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 568aaf27

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	■ ☐ ☐

ID: 568aaf27

$$x + y = 12$$
$$y = x^2$$

If (x, y) is a solution to the system of equations above, which of the following is a possible value of x?

A. 0

B. 1

C. 2

D. 3

ID: 568aaf27 Answer

Correct Answer: D

Rationale

Choice D is correct. Substituting x^2 from the second equation for y in the first equation yields $x + x^2 = 12$. Subtracting 12 from both sides of this equation and rewriting the equation results in $x^2 + x - 12 = 0$. Factoring the left-hand side of this equation yields $(x - 3)(x + 4) = 0$. Using the zero product property to solve for x, it follows that $x - 3 = 0$ and $x + 4 = 0$. Solving each equation for x yields $x = 3$ and $x = -4$, respectively. Thus, two possible values of x are 3 and -4. Of the choices given, 3 is the only possible value of x.

Choices A, B, and C are incorrect. Substituting 0 for x in the first equation gives $0 + y = 12$, or $y = 12$; then, substituting 12 for y and 0 for x in the second equation gives $12 = 0^2$, or $12 = 0$, which is false. Similarly, substituting 1 or 2 for x in the first equation yields $y = 11$ or $y = 10$, respectively; then, substituting 11 or 10 for y in the second equation yields a false statement.

Question Difficulty: Easy

Question ID b76a2815

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	■ ☐ ☐

$$P = \frac{W}{t}$$

The power P produced by a machine is represented by the equation above, where W is the work performed during an amount of time t. Which of the following correctly expresses W in terms of P and t ?

A. $W = Pt$

B. $W = \frac{P}{t}$

C. $W = \frac{t}{P}$

D. $W = P + t$

Correct Answer: A

Rationale

Choice A is correct. Multiplying both sides of the equation by t yields $P \cdot t = (\frac{W}{t}) \cdot t$, or $Pt = W$, which expresses W in terms of P and t. This is equivalent to W = Pt.

Choices B, C, and D are incorrect. Each of the expressions given in these answer choices gives W in terms of P and t but doesn't maintain the given relationship between W, P, and t. These expressions may result from performing different operations with t on each side of the equation. In choice B, W has been multiplied by t, and P has been divided by t. In choice C, W has been multiplied by t, and the quotient of P divided by t has been reciprocated. In choice D, W has been multiplied by t, and P has been added to t. However, in order to maintain the relationship between the variables in the given equation, the same operation must be performed with t on each side of the equation.

Question Difficulty: Easy

Question ID a67a439d

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	■□□

ID: a67a439d

$$x + 7 = 10$$
$$(x + 7)^2 = y$$

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

A. $(3, 100)$

B. $(3, 3)$

C. $(3, 10)$

D. $(3, 70)$

ID: a67a439d Answer

Correct Answer: A

Rationale

Choice A is correct. The solution to a system of equations is the ordered pair x, y that satisfies all equations in the system. It's given by the first equation in the system that $x + 7 = 10$. Substituting 10 for $x + 7$ into the second equation yields $10^2 = y$, or $y = 100$. The x-coordinate of the solution to the system of equations can be found by subtracting 7 from both sides of the equation $x + 7 = 10$, which yields $x = 3$. Therefore, the ordered pair $3, 100$ is a solution to the given system of equations.

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 ce940f80

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	■□□

ID: ce940f80

$$\frac{x^2}{25} = 36$$

What is a solution to the given equation?

A. 6

B. 30

C. 450

D. 900

ID: ce940f80 Answer

Correct Answer: B

Rationale

Choice B is correct. Multiplying the left- and right-hand sides of the given equation by 25 yields $x^2 = 900$. Taking the square root of the left- and right-hand sides of this equation yields $x = 30$ or $x = -30$. Of these two solutions, only 30 is given as a choice.

Choice A is incorrect. This is a solution to the equation $x^2 = 36$.

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 c7789423

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	■□□

ID: c7789423

$$|x - 2| = 9$$

What is one possible solution to the given equation?

ID: c7789423 Answer

Correct Answer: 11, -7

Rationale

The correct answer is 11 or -7. By the definition of absolute value, if $x - 2 = 9$, then $x - 2 = 9$ or $x - 2 = -9$. Adding 2 to both sides of the equation $x - 2 = 9$ yields $x = 11$. Adding 2 to both sides of the equation $x - 2 = -9$ yields $x = -7$. Thus, the given equation, $x - 2 = 9$, has two possible solutions, 11 and -7. Note that 11 and -7 are examples of ways to enter a correct answer.

Question Difficulty: Easy

Question ID eb268057

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	■□□

ID: eb268057

$$x^2 = 64$$

Which of the following values of x satisfies the given equation?

A. -8

B. 4

C. 32

D. 128

ID: eb268057 Answer

Correct Answer: A

Rationale

Choice A is correct. Solving for x by taking the square root of both sides of the given equation yields $x = 8$ or $x = -8$. Of the choices given, -8 satisfies the given equation.

Choice B is incorrect and may result from a calculation error when solving for x. Choice C is incorrect and may result from dividing 64 by 2 instead of taking the square root. Choice D is incorrect and may result from multiplying 64 by 2 instead of taking the square root.

Question Difficulty: Easy

Question ID 98f735f2

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	■□□

ID: 98f735f2

The total revenue from sales of a product can be calculated using the formula $T = PQ$, where T is the total revenue, P is the price of the product, and Q is the quantity of the product sold. Which of the following equations gives the quantity of product sold in terms of P and T?

A. $Q = \dfrac{P}{T}$

B. $Q = \dfrac{T}{P}$

C. $Q = PT$

D. $Q = T - P$

ID: 98f735f2 Answer

Correct Answer: B

Rationale

Choice B is correct. Solving the given equation for Q gives the quantity of the product sold in terms of P and T. Dividing both sides of the given equation by P yields $\dfrac{T}{P} = Q$, or $Q = \dfrac{T}{P}$. Therefore, $Q = \dfrac{T}{P}$ gives the quantity of product sold in terms of P and T.

Choice A is incorrect and may result from an error when dividing both sides of the given equation by P. Choice C is incorrect and may result from multiplying, rather than dividing, both sides of the given equation by P. Choice D is incorrect and may result from subtracting P from both sides of the equation rather than dividing both sides by P.

Question Difficulty: Easy

Question ID fcb78856

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	■□□

$$b = 42cf$$

The given equation relates the positive numbers b, c, and f. Which equation correctly expresses c in terms of b and f?

A. $c = \frac{b}{42f}$

B. $c = \frac{b-42}{f}$

C. $c = 42bf$

D. $c = 42 - b - f$

Correct Answer: A

Rationale

Choice A is correct. It's given that the equation $b = 42cf$ relates the positive numbers b, c, and f. Dividing each side of the given equation by $42f$ yields $\frac{b}{42f} = c$, or $c = \frac{b}{42f}$. Thus, the equation $c = \frac{b}{42f}$ correctly expresses c in terms of b and f.

Choice B is incorrect. This equation can be rewritten as $b = cf + 42$.

Choice C is incorrect. This equation can be rewritten as $b = \frac{c}{42f}$.

Choice D is incorrect. This equation can be rewritten as $b = 42 - c - f$.

Question Difficulty: Easy

Question ID 4236c5a3

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	■ ☐ ☐

If $(x+5)^2 = 4$, which of the following is a possible value of x?

A. 1

B. -1

C. -2

D. -3

Correct Answer: D

Rationale

Choice D is correct. If $(x+5)^2 = 4$, then taking the square root of each side of the equation gives $x+5=2$ or $x+5=-2$. Solving these equations for x gives $x=-3$ or $x=-7$. Of these, -3 is the only solution given as a choice.

Choice A is incorrect and may result from solving the equation $x+5=4$ and making a sign error. Choice B is incorrect and may result from solving the equation $x+5=4$. Choice C is incorrect and may result from finding a possible value of $x+5$.

Question Difficulty: Easy

Question ID f11ffa93

Assessment	Test	Domain	Skill	Difficulty
SAT	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	■□□

ID: f11ffa93

$$\sqrt{x+4} = 11$$

What value of x satisfies the equation above?

ID: f11ffa93 Answer

Rationale

The correct answer is 117. Squaring both sides of the given equation gives $x+4 = 11^2$, or $x+4 = 121$. Subtracting 4 from both sides of this equation gives $x = 117$.

Question Difficulty: Easy