

Question ID 2d1e5eff

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

ID: 2d1e5eff

$$\begin{aligned}y &= 2x^2 - 21x + 64 \\ y &= 3x + a\end{aligned}$$

In the given system of equations, a is a constant. The graphs of the equations in the given system intersect at exactly one point, (x, y) , in the xy -plane. What is the value of x ?

- A. -8
- B. -6
- C. 6
- D. 8

Question ID 68298043

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

ID: 68298043

$$\begin{aligned}y + k &= x + 26 \\ y - k &= x^2 - 5x\end{aligned}$$

In the given system of equations, k is a constant. The system has exactly one distinct real solution. What is the value of k ?

Question ID 65244c8d

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

ID: 65244c8d

$$\sqrt{(x - 2)^2} = \sqrt{3x + 34}$$

What is the smallest solution to the given equation?

Question ID 8217606b

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

ID: 8217606b

$$64x^2 - (16a + 4b)x + ab = 0$$

In the given equation, a and b are positive constants. The sum of the solutions to the given equation is $k(4a + b)$, where k is a constant. What is the value of k ?

Question ID 0e4cd7da

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

ID: 0e4cd7da

Which quadratic equation has no real solutions?

- A. $x^2 + 14x - 49 = 0$
- B. $x^2 - 14x + 49 = 0$
- C. $5x^2 - 14x - 49 = 0$
- D. $5x^2 - 14x + 49 = 0$

Question ID 536832c0

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

ID: 536832c0

In the xy -plane, a line with equation $2y = 4.5$ intersects a parabola at exactly one point. If the parabola has equation $y = -4x^2 + bx$, where b is a positive constant, what is the value of b ?

Question ID 6c28bdc9

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

ID: 6c28bdc9

$$x(x + 1) - 56 = 4x(x - 7)$$

What is the sum of the solutions to the given equation?

Question ID c9d2651d

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

ID: c9d2651d

If $3x^2 - 18x - 15 = 0$, what is the value of $x^2 - 6x$?

Question ID b40b491b

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

ID: b40b491b

$$\frac{14x}{7y} = 2\sqrt{w + 19}$$

The given equation relates the distinct positive real numbers w , x , and y . Which equation correctly expresses w in terms of x and y ?

- A. $w = \sqrt{\frac{x}{y}} - 19$
- B. $w = \sqrt{\frac{28x}{14y}} - 19$
- C. $w = \left(\frac{x}{y}\right)^2 - 19$
- D. $w = \left(\frac{28x}{14y}\right)^2 - 19$

Question ID d9799723

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

ID: d9799723

$$x^2 - 40x - 10 = 0$$

What is the sum of the solutions to the given equation?

- A. 0
- B. 5
- C. 10
- D. 40

Question ID 9298a52e

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

ID: 9298a52e

$$x^2 + y + 7 = 7$$

$$20x + 100 - y = 0$$

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

Question ID 8e46ba71

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

ID: 8e46ba71

$$\sqrt{k - x} = 58 - x$$

In the given equation, k is a constant. The equation has exactly one real solution. What is the minimum possible value of $4k$?

Question ID e1774551

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

ID: e1774551

$| -5x + 13 | = 73$

What is the sum of the solutions to the given equation?

- A. $-\frac{146}{5}$
- B. -12
- C. 0
- D. $\frac{26}{5}$

Question ID cde831b3

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

ID: cde831b3

$$x^2 - 2x - 9 = 0$$

One solution to the given equation can be written as $1 + \sqrt{k}$, where k is a constant. What is the value of k ?

- A. 8
- B. 10
- C. 20
- D. 40

Question ID 95b69a20

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

ID: 95b69a20

$$\frac{x^2}{\sqrt{x^2-c^2}} = \frac{c^2}{\sqrt{x^2-c^2}} + 39$$

In the given equation, c is a positive constant. Which of the following is one of the solutions to the given equation?

- A. $-c$
- B. $-c^2 - 39^2$
- C. $-\sqrt{39^2 - c^2}$
- D. $-\sqrt{c^2 + 39^2}$

Question ID b939a904

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

ID: b939a904

$$64x^2 + bx + 25 = 0$$

In the given equation, b is a constant. For which of the following values of b will the equation have more than one real solution?

- A. -91
- B. -80
- C. 5
- D. 40

Question ID 1844a2ab

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

ID: 1844a2ab

$$\begin{aligned}y &= -2.5 \\ y &= x^2 + 8x + k\end{aligned}$$

In the given system of equations, k is a positive integer constant. The system has no real solutions. What is the least possible value of k ?

Question ID 98a35f81

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

ID: 98a35f81

$$x(kx - 56) = -16$$

In the given equation, k is an integer constant. If the equation has no real solution, what is the least possible value of k ?

Question ID 2d8f1f6a

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

ID: 2d8f1f6a

$$\begin{aligned}8x + y &= -11 \\ 2x^2 &= y + 341\end{aligned}$$

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

- A. -15
- B. -11
- C. 2
- D. 8

Question ID 962eb92e

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

ID: 962eb92e

$$\frac{12}{n} - \frac{2}{t} = -\frac{2}{w}$$

The given equation relates the variables n , t , and w , where $n > 0$, $t > 0$, and $w > t$. Which expression is equivalent to n ?

- A. $12tw$
- B. $6(t - w)$
- C. $\frac{w-t}{6tw}$
- D. $\frac{6tw}{w-t}$

Question ID 2e655326

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

ID: 2e655326

$$-2x^2 + 20x + c = 0$$

In the given equation, c is a constant. The equation has exactly one solution. What is the value of c ?

- A. -68
- B. -50
- C. -32
- D. 0

Question ID edcedac7

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

ID: edcedac7

The solutions to $x^2 + 6x + 7 = 0$ are r and s , where $r < s$. The solutions to $x^2 + 8x + 8 = 0$ are t and u , where $t < u$. The solutions to $x^2 + 14x + c = 0$, where c is a constant, are $r + t$ and $s + u$. What is the value of c ?

Question ID 14fe10e5

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

ID: 14fe10e5

$|x - 9| + 45 = 63$

What is the sum of the solutions to the given equation?

Question ID 960aabc0

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

ID: 960aabc0

In the xy -plane, a line with equation $2y = c$ for some constant c intersects a parabola at exactly one point. If the parabola has equation $y = -2x^2 + 9x$, what is the value of c ?

Question ID 2b7d8635

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

ID: 2b7d8635

$$\begin{aligned}y &= -1.5 \\ y &= x^2 + 8x + a\end{aligned}$$

In the given system of equations, a is a positive constant. The system has exactly one distinct real solution. What is the value of a ?

Question ID 59cf1dd3

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

ID: 59cf1dd3

$$(x - 1)^2 = -4$$

How many distinct real solutions does the given equation have?

- A. Exactly one
- B. Exactly two
- C. Infinitely many
- D. Zero

Question ID 33cc7555

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

ID: 33cc7555

$$2|4 - x| + 3|4 - x| = 25$$

What is the positive solution to the given equation?

Question ID a4b12e2f

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

ID: a4b12e2f

$$-9x^2 + 30x + c = 0$$

In the given equation, c is a constant. The equation has exactly one solution. What is the value of c ?

- A. 3
- B. 0
- C. -25
- D. -53

Question ID 9f13fad1

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

ID: 9f13fad1

$$-16x^2 - 8x + c = 0$$

In the given equation, c is a constant. The equation has exactly one solution. What is the value of c ?

Question ID b2e26a55

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

ID: b2e26a55

In the xy -plane, the graph of the equation $y = -x^2 + 9x - 100$ intersects the line $y = c$ at exactly one point. What is the value of c ?

- A. $-\frac{481}{4}$
- B. -100
- C. $-\frac{319}{4}$
- D. $-\frac{9}{2}$

Question ID 032caee7

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

ID: 032caee7

$$x^2 - 34x + c = 0$$

In the given equation, c is a constant. The equation has no real solutions if $c > n$. What is the least possible value of n ?

Question ID 37cf569f

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

ID: 37cf569f

$$(x - 47)^2 = 1$$

What is the sum of the solutions to the given equation?

Question ID 54fecb11

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

ID: 54fecb11

$$2x^2 - 8x - 7 = 0$$

One solution to the given equation can be written as $\frac{8-\sqrt{k}}{4}$, where k is a constant. What is the value of k ?

Question ID 14787dca

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

ID: 14787dca

$$x - 29 = (x - a)(x - 29)$$

Which of the following are solutions to the given equation, where a is a constant and $a > 30$?

- I. a
- II. $a + 1$
- III. 29

- A. I and II only
- B. I and III only
- C. II and III only
- D. I, II, and III

Question ID 409b7ab8

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

ID: 409b7ab8

$$\begin{aligned}y &= 18 \\ y &= -3(x - 18)^2 + 15\end{aligned}$$

If the given equations are graphed in the xy -plane, at how many points do the graphs of the equations intersect?

- A. Exactly one
- B. Exactly two
- C. Infinitely many
- D. Zero

Question ID e7f2ab9c

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

ID: e7f2ab9c

$$57x^2 + (57b + a)x + ab = 0$$

In the given equation, a and b are positive constants. The product of the solutions to the given equation is kab , where k is a constant. What is the value of k ?

- A. $\frac{1}{57}$
- B. $\frac{1}{19}$
- C. 1
- D. 57

Question ID 2aaaec85

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

ID: 2aaaec85

$$-x^2 + bx - 676 = 0$$

In the given equation, b is a positive integer. The equation has no real solution. What is the greatest possible value of b ?

Question ID 36ca6037

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

ID: 36ca6037

$$\frac{20}{p} = \frac{20}{q} - \frac{20}{r} - \frac{20}{s}$$

The given equation relates the positive variables p, q, r , and s . Which of the following is equivalent to q ?

- A. $p + r + s$
- B. $20(p + r + s)$
- C. $\frac{prs}{pr+ps+rs}$
- D. $\frac{prs}{20p+20r+20s}$

Question ID 1aec2be9

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

ID: 1aec2be9

$$\begin{aligned}y &= x + 9 \\ y &= x^2 + 16x + 63\end{aligned}$$

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

- A. -6
- B. 7
- C. 9
- D. 63

Question ID 9a182495

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

ID: 9a182495

$$5x^2 + 10x + 16 = 0$$

How many distinct real solutions does the given equation have?

- A. Exactly one
- B. Exactly two
- C. Infinitely many
- D. Zero

Question ID dba8a697

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

ID: dba8a697

$$5(x + 7) = 15(x - 17)(x + 7)$$

What is the sum of the solutions to the given equation?