

Question ID d7bf5261

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: d7bf5261

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

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 b2fde9d3

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: b2fde9d3

$$\begin{aligned}x^2 + y + 7 &= 7 \\ 20x + 100 - y &= 0\end{aligned}$$

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

Question ID 8e481921

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 8e481921

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

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 f11bc376

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: f11bc376

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

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 011b5078

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 011b5078

$5(x + 7) = 15(x - 17)(x + 7)$
What is the sum of the solutions to the given equation?

Question ID 851220ef

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 851220ef

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

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 91d0c03d

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 91d0c03d

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

What is the positive solution to the given equation?

Question ID a78f860c

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: a78f860c

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

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 840857f0

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 840857f0

$(d - 30)(d + 30) - 7 = -7$

What is a solution to the given equation?

Question ID 54014ba0

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 54014ba0

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

Question ID fb399cf3

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: fb399cf3

$$p = 20 + \frac{16}{n}$$

The given equation relates the numbers p and n , where n is not equal to 0 and $p > 20$. Which equation correctly expresses n in terms of p ?

- A. $n = \frac{p-20}{16}$
- B. $n = \frac{p}{16} + 20$
- C. $n = \frac{p}{16} - 20$
- D. $n = \frac{16}{p-20}$

Question ID a4baf8ba

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: a4baf8ba

$38x^2 = 38(9)$

What is the negative solution to the given equation?

Question ID 39cbb638

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 39cbb638

$$y = 18$$
$$y = -3(x - 18)^2 + 15$$

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 bf9cec0d

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: bf9cec0d

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

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 a66d2c0f

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: a66d2c0f

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 1c7fa590

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 1c7fa590

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

What is the smallest solution to the given equation?

Question ID c1a53bc9

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: c1a53bc9

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

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

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

Question ID e4c5e586

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: e4c5e586

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

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 e8c30041

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: e8c30041

$w^2 + 12w - 40 = 0$

Which of the following is a solution to the given equation?

- A. $6 - 2\sqrt{19}$
- B. $2\sqrt{19}$
- C. $\sqrt{19}$
- D. $-6 + 2\sqrt{19}$

Question ID 90206d7a

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 90206d7a

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

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

Question ID f3665402

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: f3665402

$|x - 9| + 45 = 63$

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

Question ID 043afcfc

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 043afcfc

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 b57aa354

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: b57aa354

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 d3042402

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: d3042402

$$7x^2 - 20x - 32 = 0$$

What is the positive solution to the given equation?

Question ID 50dfcb6a

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 50dfcb6a

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

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 7046a0da

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 7046a0da

$x^2 + y + 10 = 10$

$8x + 16 - y = 0$

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

- A. -16
- B. -4
- C. 2
- D. 8

Question ID 0ccd0652

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 0ccd0652

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

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 5b205ed2

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 5b205ed2

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

How many distinct real solutions does the given equation have?

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

Question ID 423265ec

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 423265ec

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

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 9c14cee3

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 9c14cee3

$$x = 8a(b + 9)$$

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

- A. $a = \frac{x}{8} - (b + 9)$
- B. $a = \frac{x}{8(b+9)}$
- C. $a = \frac{8(b+9)}{x}$
- D. $a = 8x(b + 9)$

Question ID d7706113

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: d7706113

$y = x + 9$

$y = x^2 + 16x + 63$

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 3d8c1891

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 3d8c1891

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

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

Question ID 0ac483b4

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 0ac483b4

$$P = N(19 - C)$$

The given equation relates the positive numbers P , N , and C . Which equation correctly expresses C in terms of P and N ?

- A. $C = \frac{19+P}{N}$
- B. $C = \frac{19-P}{N}$
- C. $C = 19 + \frac{P}{N}$
- D. $C = 19 - \frac{P}{N}$

Question ID 64a7a257

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 64a7a257

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

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 1a4b397c

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 1a4b397c

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

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 dbb15274

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: dbb15274

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

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 b30bb27f

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: b30bb27f

$$p = \frac{k}{4j+9}$$

The given equation relates the distinct positive numbers p , k , and j . Which equation correctly expresses $4j + 9$ in terms of p and k ?

- A. $4j + 9 = \frac{k}{p}$
- B. $4j + 9 = kp$
- C. $4j + 9 = k - p$
- D. $4j + 9 = \frac{p}{k}$

Question ID 707185e0

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 707185e0

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 9a614311

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 9a614311

$y = 2x^2 - 21x + 64$

$y = 3x + a$

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 5108645e

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 5108645e

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

How many distinct real solutions does the given equation have?

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

Question ID 160f2a35

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 160f2a35

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 46b433ae

Assessment	Test	Domain	Skill	Difficulty
PSAT/NMSQT & PSAT 10	Math	Advanced Math	Nonlinear equations in one variable and systems of equations in two variables	<div><div></div><div></div><div></div></div>

ID: 46b433ae

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

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