

## Solving Systems of Equations by Substitution

Solve each system by substitution.

1)  $y = 6x - 11$   
 $-2x - 3y = -7$

2)  $2x - 3y = -1$   
 $y = x - 1$

3)  $y = -3x + 5$   
 $5x - 4y = -3$

4)  $-3x - 3y = 3$   
 $y = -5x - 17$

5)  $y = -2$   
 $4x - 3y = 18$

6)  $y = 5x - 7$   
 $-3x - 2y = -12$

7)  $-4x + y = 6$   
 $-5x - y = 21$

8)  $-7x - 2y = -13$   
 $x - 2y = 11$

9)  $-5x + y = -2$   
 $-3x + 6y = -12$

10)  $-5x + y = -3$   
 $3x - 8y = 24$

Solving Systems of Equations by Substitution

Solve each system by substitution.

1)  $y = 6x - 11$   
 $-2x - 3y = -7$

$$\begin{aligned} -2x - 3(6x - 11) &= -7 \\ -2x - 18x + 33 &= -7 \\ -20x + 33 &= -7 \\ -20x + 33 - 33 &= -7 - 33 \\ -20x &= -40 \\ \frac{-20x}{-20} &= \frac{-40}{-20} \\ x &= 2 \end{aligned}$$

$$\begin{aligned} y &= 6x - 11 \\ y &= 6(2) - 11 \\ y &= 12 - 11 \\ y &= 1 \end{aligned}$$

(2, 1)

3)  $y = -3x + 5$   
 $5x - 4y = -3$

$$\begin{aligned} 5x - 4(-3x + 5) &= -3 \\ 5x + 12x - 20 &= -3 \\ 17x - 20 &= -3 \\ 17x - 20 + 20 &= -3 + 20 \\ 17x &= 17 \\ \frac{17x}{17} &= \frac{17}{17} \\ x &= 1 \end{aligned}$$

$$\begin{aligned} y &= -3x + 5 \\ y &= -3(1) + 5 \\ y &= -3 + 5 \\ y &= 2 \end{aligned}$$

(1, 2)

5)  $y = -2$   
 $4x - 3y = 18$

$$\begin{aligned} 4x - 3(-2) &= 18 \\ 4x + 6 &= 18 \\ 4x + 6 - 6 &= 18 - 6 \\ 4x &= 12 \\ \frac{4x}{4} &= \frac{12}{4} \\ x &= 3 \end{aligned}$$

(3, -2)

7)  $-4x + y = 6 \rightarrow$  rearrange:  $y = 6 + 4x$   
 $-5x - y = 21$

$$\begin{aligned} -5x - (6 + 4x) &= 21 \\ -5x - 6 - 4x &= 21 \\ -9x - 6 &= 21 \\ -9x - 6 + 6 &= 21 + 6 \\ -9x &= 27 \\ \frac{-9x}{-9} &= \frac{27}{-9} \\ x &= -3 \end{aligned}$$

$$\begin{aligned} y &= 6 + 4x \\ y &= 6 + 4(-3) \\ y &= 6 - 12 \\ y &= -6 \end{aligned}$$

(-3, -6)

9)  $-5x + y = -2$  rearrange:  $y = -2 + 5x$   
 $-3x + 6y = -12$

$$\begin{aligned} -3x + 6(-2 + 5x) &= -12 \\ -3x - 12 + 30x &= -12 \\ 27x - 12 &= -12 \\ 27x - 12 + 12 &= -12 + 12 \\ 27x &= 0 \\ \frac{27x}{27} &= \frac{0}{27} \\ x &= 0 \end{aligned}$$

$$\begin{aligned} y &= -2 + 5x \\ y &= -2 + 5(0) \\ y &= -2 + 0 \\ y &= -2 \end{aligned}$$

(0, -2)

2)  $2x - 3y = -1$   
 $y = x - 1$

$$\begin{aligned} 2x - 3(x - 1) &= -1 \\ 2x - 3x + 3 &= -1 \\ -x + 3 &= -1 \\ -x + 3 - 3 &= -1 - 3 \\ -x &= -4 \\ \frac{-x}{-1} &= \frac{-4}{-1} \\ x &= 4 \end{aligned}$$

$$\begin{aligned} y &= x - 1 \\ y &= 4 - 1 \\ y &= 3 \end{aligned}$$

(4, 3)

4)  $-3x - 3y = 3$   
 $y = -5x - 17$

$$\begin{aligned} -3x - 3(-5x - 17) &= 3 \\ -3x + 15x + 51 &= 3 \\ 12x + 51 &= 3 \\ 12x + 51 - 51 &= 3 - 51 \\ 12x &= -48 \\ \frac{12x}{12} &= \frac{-48}{12} \\ x &= -4 \end{aligned}$$

$$\begin{aligned} y &= -5(x) - 17 \\ y &= -5(-4) - 17 \\ y &= 20 - 17 \\ y &= 3 \end{aligned}$$

(-4, 3)

6)  $y = 5x - 7$   
 $-3x - 2y = -12$

$$\begin{aligned} -3x - 2(5x - 7) &= -12 \\ -3x - 10x + 14 &= -12 \\ -13x + 14 &= -12 \\ -13x + 14 - 14 &= -12 - 14 \\ -13x &= -26 \\ \frac{-13x}{-13} &= \frac{-26}{-13} \\ x &= 2 \end{aligned}$$

$$\begin{aligned} y &= 5x - 7 \\ y &= 5(2) - 7 \\ y &= 10 - 7 \\ y &= 3 \end{aligned}$$

(2, 3)

8)  $-7x - 2y = -13$   
 $x - 2y = 11$  rearrange:  $x = 11 + 2y$

$$\begin{aligned} -7(11 + 2y) - 2y &= -13 \\ -77 - 14y - 2y &= -13 \\ -77 - 16y &= -13 \\ +77 &+77 \\ -16y &= 64 \\ \frac{-16y}{-16} &= \frac{64}{-16} \\ y &= -4 \end{aligned}$$

$$\begin{aligned} x &= 11 + 2y \\ x &= 11 + 2(-4) \\ x &= 11 + (-8) \\ x &= 3 \end{aligned}$$

(3, -4)

10)  $-5x + y = -3$  rearrange:  $y = -3 + 5x$   
 $3x - 8y = 24$

$$\begin{aligned} 3x - 8(-3 + 5x) &= 24 \\ 3x + 24 - 40x &= 24 \\ -37x + 24 &= 24 \\ -37x + 24 - 24 &= 24 - 24 \\ -37x &= 0 \\ \frac{-37x}{-37} &= \frac{0}{-37} \\ x &= 0 \end{aligned}$$

$$\begin{aligned} y &= -3 + 5x \\ y &= -3 + 5(0) \\ y &= -3 + 0 \\ y &= -3 \end{aligned}$$

(0, -3)