

Solving Systems of Equations by Substitution Worksheet

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

$(2, 1)$

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

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

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

$(-2, -1)$

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

$$\begin{aligned} y &= -2 + 1 \\ y &= -1 \end{aligned}$$

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

$(1, 2)$

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

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

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

$(2, 3)$

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

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

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

$(-3, -6)$

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

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

6) $x = 1 - 3y$
 $3x + 3y = 15$

$(7, -2)$

$$\begin{aligned} -3(y - 3) + 3y &= 4 \\ -3y + 9 + 3y &= 4 \\ 9 &= 4 \end{aligned}$$

$$\begin{aligned} 3(1 - 3y) + 3y &= 15 \\ 3 - 9y + 3y &= 15 \\ 3 - 6y &= 15 \\ -3 \quad -3 & \\ \hline -6y &= 12 \\ \frac{-6y}{-6} &= \frac{12}{-6} \\ y &= -2 \end{aligned}$$

$$\begin{aligned} x &= 1 - 3(-2) \\ x &= 1 + 6 \\ x &= 7 \end{aligned}$$

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

No solution

Solving Systems of Equations by Elimination Worksheet

1) $-4x - 2y = -12$
 $4x + 8y = -24$

$(6, -6)$

$$\begin{array}{r} -4x - 2y = -12 \\ 4x + 8y = -24 \\ \hline 6y = -36 \\ \frac{6y}{6} = \frac{-36}{6} \\ y = -6 \end{array}$$

$$\begin{array}{r} 4x + 8(-6) = -24 \\ 4x - 48 = -24 \\ +48 \quad +48 \\ \hline 4x = 24 \\ \frac{4x}{4} = \frac{24}{4} \quad x = 6 \end{array}$$

2) $-6x + 5y = 1$
 $6x + 4y = -10$

$(-1, -1)$

$$\begin{array}{r} -6x + 5y = 1 \\ 6x + 4y = -10 \\ \hline 9y = -9 \\ \frac{9y}{9} = \frac{-9}{9} \\ y = -1 \end{array}$$

$$\begin{array}{r} 6x + 4(-1) = -10 \\ 6x - 4 = -10 \\ +4 \quad +4 \\ \hline 6x = -6 \\ \frac{6x}{6} = \frac{-6}{6} \\ y = -1 \end{array}$$

3) $x - y = 11$
 $2x + y = 19$

$(10, -1)$

$$\begin{array}{r} x - y = 11 \\ 2x + y = 19 \\ \hline 3x = 30 \\ \frac{3x}{3} = \frac{30}{3} \\ x = 10 \end{array}$$

$$\begin{array}{r} 10 - y = 11 \\ -10 \quad -10 \\ \hline -y = 1 \\ \frac{-y}{-1} = \frac{1}{-1} \\ y = -1 \end{array}$$

4) $-4x + 9y = 9$
 $x - 3y = -6 \rightarrow 3(x - 3y = -6)$

$(9, 5)$

$$\begin{array}{r} -4x + 9y = 9 \\ 3x - 9y = -18 \\ \hline -x = -9 \\ \frac{-x}{-1} = \frac{-9}{-1} \\ x = 9 \end{array}$$

$$\begin{array}{r} -4(9) + 9y = 9 \\ -36 + 9y = 9 \\ +36 \quad +36 \\ \hline 9y = 45 \\ \frac{9y}{9} = \frac{45}{9} \quad y = 5 \end{array}$$

5) $5x + y = 9$
 $10x - 7y = -18$

$(1, 4)$

$$\begin{array}{r} 5x + y = 9 \rightarrow 7(5x + y = 9) \rightarrow 35x + 7y = 63 \\ 10x - 7y = -18 \\ \hline 45x = 45 \\ \frac{45x}{45} = \frac{45}{45} \\ x = 1 \end{array}$$

$$\begin{array}{r} 5(1) + y = 9 \\ 5 + y = 9 \\ -5 \quad -5 \\ \hline y = 4 \end{array}$$

6) $-3x + 7y = -16$
 $-9x + 5y = 16$

$(-4, -4)$

$$\begin{array}{r} -3x + 7y = -16 \rightarrow -3(-3x + 7y = -16) \rightarrow 9x - 21y = 48 \\ -9x + 5y = 16 \\ \hline -16y = 64 \\ \frac{-16y}{-16} = \frac{64}{-16} \\ y = -4 \end{array}$$

$$\begin{array}{r} -3x + 7(-4) = -16 \\ -3x - 28 = -16 \\ +28 \quad +28 \\ \hline -3x = 12 \\ \frac{-3x}{-3} = \frac{12}{-3} \\ x = -4 \end{array}$$

7) $16x - 10y = 10$
 $-8x - 6y = 6$

$(0, -1)$

$$\begin{array}{r} 16x - 10y = 10 \rightarrow 2(-8x - 6y = 6) \rightarrow -16x - 12y = 12 \\ \hline -22y = 22 \\ \frac{-22y}{-22} = \frac{22}{-22} \\ y = -1 \end{array}$$

$$\begin{array}{r} 16x - 10(-1) = 10 \\ 16x + 10 = 10 \\ -10 \quad -10 \\ \hline 16x = 0 \\ \frac{16x}{16} = \frac{0}{16} \\ x = 0 \end{array}$$