

Solving Systems by Substitution

Solve each system by substitution.

$$1) \begin{aligned} y &= 2x - 14 \\ y &= 3x - 17 \end{aligned}$$

$$\begin{array}{r} 2x - 14 = 3x - 17 \\ -3x \quad -3x \\ \hline -x - 14 = -17 \\ +14 \quad +14 \\ \hline \end{array}$$

$$\frac{-x}{-1} = \frac{-3}{-1}$$

$$x = 3$$

$$y = 2(3) - 14$$

$$y = 6 - 14$$

$$y = -8 \quad (3, -8)$$

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

$$-3x - 2(-2) = 10$$

$$\begin{array}{r} -3x + 4 = 10 \\ -4 \quad -4 \\ \hline \end{array}$$

$$\frac{-3x}{-3} = \frac{6}{-3}$$

$$x = -2$$

We know that $y = -2$

$$(-2, -2)$$

$$2) \begin{aligned} y &= -8x + 18 \\ y &= -4x + 6 \end{aligned}$$

$$\begin{array}{r} -8x + 18 = -4x + 6 \\ +4x \quad +4x \\ \hline \end{array}$$

$$\begin{array}{r} -4x + 18 = 6 \\ -18 \quad -18 \\ \hline \end{array}$$

$$\frac{-4x}{-4} = \frac{-12}{-4}$$

$$x = 3$$

$$y = -4(3) + 6$$

$$y = -12 + 6$$

$$y = -6$$

$$(3, -6)$$

$$4) \begin{aligned} y &= 2x + 3 \\ 4x - 2y &= -6 \end{aligned}$$

$$4x - 2(2x + 3) = -6$$

$$4x - 4x - 6 = -6$$

$$-6 = -6$$

True

Infinite solutions.

$$5) \begin{aligned} 0.1y &= 0.2x + 0.7 & \times 10 \\ 0.3x - 0.4y &= -0.8 & \times 10 \end{aligned}$$

$$1y = 2x + 7$$

$$3x - 4y = -8$$

$$3x - 4(2x + 7) = -8$$

$$3x - 8x - 28 = -8$$

$$\begin{array}{r} -5x - 28 = -8 \\ + 28 \quad + 28 \\ \hline \end{array}$$

$$\begin{array}{r} -5x = 20 \\ \hline -5 \quad -5 \end{array}$$

$$x = -4$$

$$y = 2(-4) + 7$$

$$y = -8 + 7$$

$$y = -1 \quad (-4, -1)$$

$$6) \frac{1}{3}y = \frac{1}{3}x - 1 \quad \times 3$$

$$\frac{1}{7}x + \frac{4}{7}y = -1 \quad \times 7$$

$$y = x - 3$$

$$x + 4y = -7$$

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

$$x + 4x - 12 = -7$$

$$\begin{array}{r} 5x - 12 = -7 \\ + 12 \quad + 12 \\ \hline \end{array}$$

$$\begin{array}{r} 5x = 5 \\ \hline 5 \quad 5 \end{array}$$

$$x = 1$$

$$y = 1 - 3$$

$$y = -2$$

$$(1, -2)$$

$$7) \begin{aligned} 3x + y &= 8 \\ 4x + 2y &= 10 \end{aligned}$$

$$3x + y = 8 \rightarrow y = -3x + 8$$

$$4x + 2(-3x + 8) = 10$$

$$4x - 6x + 16 = 10$$

$$\begin{array}{r} -2x + 16 = 10 \\ - 16 \quad - 16 \\ \hline \end{array}$$

$$\begin{array}{r} -2x = -6 \\ \hline -2 \quad -2 \end{array}$$

$$x = 3$$

$$y = -3(3) + 8$$

$$y = -9 + 8$$

$$y = -1 \quad (3, -1)$$

$$8) \begin{aligned} y &= 0 \\ 2x + 2y &= 6 \end{aligned}$$

$$2x + 2(0) = 6$$

$$2x + 0 = 6$$

$$\begin{array}{r} 2x = 6 \\ \hline 2 \quad 2 \end{array}$$

$$x = 3$$

We know that $y = 0$

$$(3, 0)$$