

# Lesson 3.7 Solving 2-Variable Linear Equation Systems

Systems of equations can be solved by using the **method of elimination** following the steps below.

$$3x + 4y = 31$$

$$2x - y = 6$$

$$2x - y = 6$$

$$2x - y - 2x = 6 - 2x$$

$$-y = 6 - 2x$$

$$y = -6 + 2x$$

$$3x + 4(-6 + 2x) = 31$$

$$3x - 24 + 8x = 31$$

$$11x - 24 = 31$$

$$11x - 24 + 24 = 31 + 24$$

$$11x = 55$$

$$11x \div 11 = 55 \div 11$$

$$x = 5$$

$$y = -6 - 2(5)$$

$$y = -16$$

**Step 1:** Use inverse operations to isolate one variable on one side of the equation.

**Step 2:** Substitute the new equation in place of the appropriate variable so there is only one variable in the new equation.

**Step 3:** Use inverse operations and the distributive property to find a solution for the variable.

**Step 4:** Substitute the value of the variable in one of the equations and solve.

Use elimination to solve each system of equations.

**a**

**1.**

$$\begin{aligned} -4x - 2y &= -12 \\ 4x + 8y &= -24 \end{aligned}$$

$$x = \underline{\hspace{2cm}}, y = \underline{\hspace{2cm}}$$

**2.**

$$\begin{aligned} x - y &= 11 \\ 2x + y &= 19 \end{aligned}$$

$$x = \underline{\hspace{2cm}}, y = \underline{\hspace{2cm}}$$

**3.**

$$\begin{aligned} -2x - 9y &= -25 \\ -4x - 9y &= -23 \end{aligned}$$

$$x = \underline{\hspace{2cm}}, y = \underline{\hspace{2cm}}$$

**b**

$$\begin{aligned} 4x + 8y &= 20 \\ -4x + 2y &= -30 \end{aligned}$$

$$x = \underline{\hspace{2cm}}, y = \underline{\hspace{2cm}}$$

$$\begin{aligned} -6x + 5y &= 1 \\ 6x + 4y &= -10 \end{aligned}$$

$$x = \underline{\hspace{2cm}}, y = \underline{\hspace{2cm}}$$

$$\begin{aligned} 8x + y &= -16 \\ -3x + y &= -5 \end{aligned}$$

$$x = \underline{\hspace{2cm}}, y = \underline{\hspace{2cm}}$$