

## Warm Up!

Determine which number must go in each blank to make each statement **true**.

1.  $2 \times \underline{2} = 4$

2.  $\underline{5} \times 1 = 5$

3.  $\underline{3} \times 3 = 9$

4.  $6 \times \underline{1} = 6$

# Elimination Using Multiplication

## Clear Learning Target

You will be able to solve linear systems of equations algebraically using multiplication and the elimination method.

**Example #1: Solve.**

$$2(9x + 1y = 13) \rightarrow 18x + 2y = 26$$

$$3x + 2y = -4 \rightarrow \ominus 3x + 2y = -4$$

$$\hline 15x + \cancel{4y} = 30$$

$$3(2) + 2y = -4$$

$$\cancel{6} + 2y = -4$$

$$-6 + 2y = -4$$

$$2y = -10$$

$$y = -5$$

$$(2, -5)$$

$$\cancel{15x} = 30$$

$$\cancel{15} = 15$$

$$x = 2$$

**You Try! Solve.**

$$\begin{array}{r}
 7x + 3y = 27 \rightarrow 7x + 3y = 27 \\
 3(2x - y = 4) \rightarrow 6x - 3y = 12 \\
 \hline
 7(3) + 3y = 27 \quad 13x + 0y = 39 \\
 21 + 3y = 27 \quad 13x = 39 \\
 -21 \quad \quad \quad -21 \\
 \hline
 3y = 6 \\
 y = 2 \\
 \hline
 13x = 39 \\
 x = 3 \\
 \hline
 \boxed{(3, 2)}
 \end{array}$$

**Example #2: Solve.**

$$\begin{array}{r}
 4x + 3y = 1 \rightarrow 4x + 3y = 1 \\
 2(2x + 5y = 11) \rightarrow 4x + 10y = 22 \\
 \hline
 4x + 3(3) = 1 \\
 4x + 9 = 1 \\
 -9 \quad -9 \\
 \hline
 4x = -8 \\
 x = -2 \\
 \hline
 4x + 10y = 22 \\
 0x - 7y = -21 \\
 -7y = -21 \\
 y = 3 \\
 \hline
 \boxed{(-2, 3)} \quad \boxed{y = 3}
 \end{array}$$

**You Try! Solve.**

$$2(3x - 3y = -6) \rightarrow 6x - 6y = -12$$

$$-5x + 6y = 12 \quad \oplus \rightarrow -5x + 6y = 12$$

$$\cancel{-5x} + 6y = 12$$

$$\cancel{6y} = \frac{12}{6}$$

$$y = 2$$

$$x + \cancel{0y} = 0$$

$$x = 0$$

$$(0, 2)$$