

Warm Up: 8 Minute Check-Up

Complete 8-Minute Check Up Now

Speak Like A Mathematician

elimination: a method that involves eliminating a variable by combining the individual equations within a system of equations.

$$23 + 54$$

$$\begin{array}{r} 5 \\ 2 \\ 3 \end{array}$$

3 Ways to Solve Systems

- 1) Graphing
- 2) Substitution
- 3) Elimination

Example 1:

Use Elimination to solve each system of equations.

$$\begin{array}{r} 3x + 5y = 11 \\ + \quad 5x - 5y = 5 \\ \hline 8x = 16 \\ \frac{8x}{8} = \frac{16}{8} \end{array}$$

$$\boxed{x = 2}$$

$$(2, 1)$$

$$\begin{array}{r} 5(2) - 5y = 5 \\ 10 - 5y = 5 \\ -10 \quad -5y = -5 \\ \hline -5y = -5 \\ \frac{-5y}{-5} = \frac{-5}{-5} \\ \boxed{y = 1} \end{array}$$

$$\begin{array}{r} -x + 3y = -8 \\ + \quad 2x - 3y = -8 \\ \hline \boxed{x} = -16 \end{array}$$

$$\begin{array}{r} -(-16) + 3y = -8 \\ 16 + 3y = -8 \\ -16 \quad -16 \\ \hline 3y = -24 \\ \frac{3y}{3} = \frac{-24}{3} \end{array}$$

$$(-16, -8)$$

$$\boxed{y = -8}$$

$$\begin{array}{r} 4x + 6y = 8 \\ 4x - 2y = 9 \end{array}$$



$$\begin{array}{r} 3x + 6y = 30 \\ -1(5x + 6y = 6) \end{array}$$

$$\begin{array}{r} 3x + 6y = 30 \\ + \quad -5x - 6y = -6 \\ \hline -2x = 24 \\ \frac{-2x}{-2} = \frac{24}{-2} \\ \boxed{x = -12} \end{array}$$

$$\begin{array}{r} 3(-12) + 6y = 30 \\ -36 + 6y = 30 \\ +36 \quad +36 \\ \hline 6y = 66 \\ \frac{6y}{6} = \frac{66}{6} \\ \boxed{y = 11} \end{array}$$

$$(-12, 11)$$

$$\begin{array}{r} -17x - 13y = 57 \\ -17x + 2y = -20 \end{array}$$



$$\begin{array}{r} 5x + 13y = 20 \\ + \quad -5x - 3y = 30 \\ \hline 10y = 50 \\ \frac{10y}{10} = \frac{50}{10} \\ \boxed{y = 5} \end{array}$$

$$\begin{array}{r} -5x - 3(5) = 30 \\ -5x - 15 = 30 \\ +5x \quad +5x \\ \hline -5x = 45 \\ \frac{-5x}{-5} = \frac{45}{-5} \\ \boxed{x = -9} \end{array}$$

$$(-9, 5)$$

Example 2: Write and Solve a System of Equations

- A) Two times a number x minus six times another number y is negative six.
 Negative two times a number x plus five times another number y is eighteen. Write and solve a system of equations to find the numbers.

$$\begin{array}{r} 2x - 6y = -6 \\ + \quad -2x + 5y = 18 \\ \hline -1(-y = 12) \\ \boxed{y = -12} \end{array}$$

$$\begin{array}{r} 2x - 6(-12) = -6 \\ 2x + 72 = -6 \\ 2x = -78 \\ \boxed{x = -39} \end{array}$$

- B) Negative four times a number plus four times another number is zero.
 Four times a number minus seven times another number is eighteen.
Write and solve a system of equations to find the numbers.

$$\begin{array}{r} -4x + 4y = 0 \\ 4x - 7y = 18 \\ \hline -3y = 18 \\ \boxed{y = -6} \end{array}$$

$$\begin{array}{r} -4x + 4(-6) = 0 \\ -4x - 24 = 0 \\ -4x = 24 \\ \boxed{x = -6} \end{array}$$

-6 and -6

- C) Mei and Kara build computers from parts and sell them to make a profit. Mei can build a computer in 0.9 hours, and Kara can build one in 1.2 hours. During a typical week, Mei and Kara spend a total of 15 hours building computers. One week, Mei builds twice as many computers than she normally does and the two spend a total of 24 hours on their project. How many computers do Mei and Kara make during a typical week?

Let m = # of comp Mei makes
 Let k = # of comp Kara makes

$$\begin{array}{r} 0.9m + 1.2k = 15 \\ 0.9(2m) + 1.2k = 24 \\ \hline 0.9m + 1.2k = 15 \\ -1(1.8m + 1.2k = 24) \end{array}$$

$$\begin{array}{r} 0.9m + 1.2k = 15 \\ -1.8m - 1.2k = -24 \\ \hline -0.9m = -9 \\ \div 0.9 \quad \div 0.9 \\ \boxed{m = 10} \end{array}$$

$$\begin{array}{r} 0.9 + 1.2k = 15 \\ 1.2k = 6 \\ \boxed{k = 5} \end{array}$$