

Learning Target:

Question/Main Ideas:	Notes:
Key Idea to Solving by Elimination	Eliminate one variable!
Example 1: Solving a System by Adding	Solve the system using the Elimination Method. $\begin{array}{r} 2x + 5y = 17 \\ + \quad 6x - 5y = -9 \\ \hline 8x = 8 \\ \frac{8x}{8} = \frac{8}{8} \\ x = 1 \end{array}$ $\begin{array}{r} 2(1) + 5y = 17 \\ 2 + 5y = 17 \\ -2 \quad -2 \\ \hline 5y = 15 \\ \frac{5y}{5} = \frac{15}{5} \\ y = 3 \end{array}$ $(1, 3)$
Now It's Your Turn	Solve the system using the Elimination Method. $\begin{array}{r} 5x - 6y = -32 \\ + \quad 3x + 6y = 48 \\ \hline 8x = 16 \\ \frac{8x}{8} = \frac{16}{8} \\ x = 2 \end{array}$ $\begin{array}{r} 3(2) + 6y = 48 \\ 6 + 6y = 48 \\ -6 \quad -6 \\ \hline 6y = 42 \\ \frac{6y}{6} = \frac{42}{6} \\ y = 7 \end{array}$ $(2, 7)$
What if the Variables Don't Eliminate Just by Adding?	multiply by a constant first!
Example 2: Solving a System by Multiplying One Equation	Solve the system using the Elimination Method. $\begin{array}{r} -2x + 15y = -32 \\ 3(7x - 5y = 17) \Rightarrow 21x - 15y = 51 \\ \hline 19x = 19 \\ \frac{19x}{19} = \frac{19}{19} \\ x = 1 \end{array}$ $(1, -2)$ $\begin{array}{r} -2(1) + 15y = -32 \\ -2 + 15y = -32 \\ +2 \quad +2 \\ \hline 15y = -30 \\ \frac{15y}{15} = \frac{-30}{15} \\ y = -2 \end{array}$

Now It's Your Turn

Solve the system using the Elimination Method.

$$\begin{array}{rcl} 6x + 5y & = & 13 \\ 3(-2x + 3y) & = & 5 \Rightarrow \\ \hline -6x + 9y & = & 15 \\ \hline 14y & = & 28 \\ \frac{14}{14} & & \frac{28}{14} \\ y & = & 2 \end{array}$$

$$\begin{array}{rcl} -2x + 3(2) & = & 5 \\ -2x + 6 & = & 5 \\ \hline -6 & = & -6 \\ \hline -2x & = & -1 \\ \frac{-2x}{-2} & = & \frac{-1}{-2} \\ x & = & \frac{1}{2} \end{array}$$

$$\boxed{\left(\frac{1}{2}, 2\right)}$$

Example 3: Solving a Linear System by Multiplying Both Equations

Solve the system using the Elimination Method.

$$\begin{array}{rcl} 2(4x + 3y) & = & -19 \Rightarrow \\ 3(3x - 2y) & = & -10 \\ \hline 8x + 6y & = & -38 \\ 9x - 6y & = & -30 \\ \hline 17x & = & -68 \\ \frac{17}{17} & & \frac{-68}{17} \\ x & = & -4 \end{array}$$

$$\begin{array}{rcl} 3(-4) - 2y & = & -10 \\ -12 - 2y & = & -10 \\ \hline +12 & & +12 \\ \hline -2y & = & 2 \\ \frac{-2y}{-2} & = & \frac{2}{-2} \\ y & = & -1 \end{array}$$

$$\boxed{(-4, -1)}$$

Now it's your turn!

Solve the system using the Elimination Method.

$$\begin{array}{rcl} 5(3x - 2y) & = & 2 \Rightarrow \\ -2(5x - 5y) & = & 10 \\ \hline 15x - 10y & = & 2 \\ -10x + 10y & = & 10 \\ \hline 5x & = & -8 \\ \frac{5x}{5} & = & \frac{-8}{5} \\ x & = & -\frac{8}{5} \end{array}$$

$$\begin{array}{rcl} 3(-2) - 2y & = & 2 \\ -6 - 2y & = & 2 \\ \hline +6 & & +6 \\ \hline -2y & = & 8 \\ \frac{-2y}{-2} & = & \frac{8}{-2} \\ y & = & -4 \end{array}$$

$$\boxed{\left(-\frac{8}{5}, -4\right)}$$