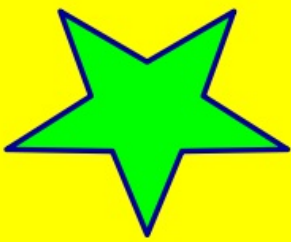


ELIMINATION METHOD

Main Ideas/Questions	Notes/Examples
Elimination Method	a method of solving a system of equations by adding or subtracting to eliminate a variable.
Steps to solve	<ul style="list-style-type: none">• Step 1: Make sure the equations are lined up!• Step 2: <u>Add</u> or <u>subtract</u> the equations to eliminate the variable with common <u>coefficient</u>.• Step 3: <u>Solve</u> for the remaining variable.• Step 4: <u>Plug-in</u> your answer into either original equation and <u>Solve</u> for the other variable.

Solving Using Elimination

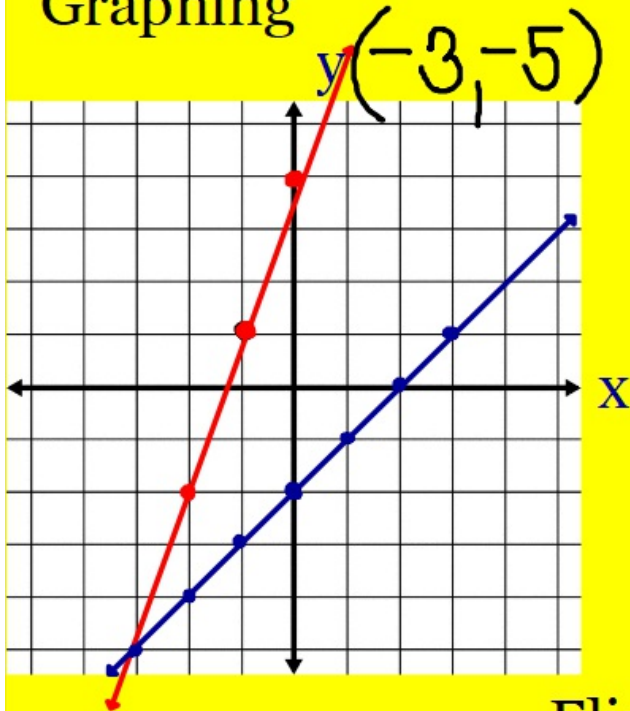
Are the equations lined up?
 Do x or y have matching coefficients?
 Eliminate x or y?
 Are the signs the same or different?
 Add or subtract?



$$y = 3x + 4$$

$$y = x - 2$$

Graphing



Substitution

$$\begin{array}{r} 3x + 4 = x - 2 \\ -x \quad -x \\ \hline 2x + 4 = -2 \\ -4 \quad -4 \\ \hline 2x = -6 \\ \frac{2x}{2} = \frac{-6}{2} \\ x = -3 \end{array}$$

$$\begin{array}{l} y = x - 2 \\ y = -3 - 2 \\ y = -5 \end{array}$$

$(-3, -5)$

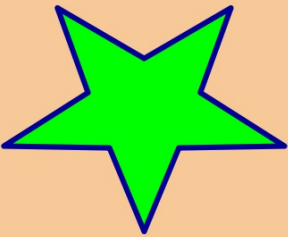
Elimination

$$\begin{array}{r} y = 3x + 4 \\ (-) \quad y = x - 2 \\ \hline 0 = 2x + 6 \\ -6 \quad -6 \\ \hline -6 = 2x \\ \frac{-6}{2} = \frac{2x}{2} \\ -3 = x \end{array}$$

$$\begin{array}{l} y = 3(-3) + 4 \\ y = -9 + 4 \\ y = -5 \end{array}$$

$(-3, -5)$

Solving Using Elimination



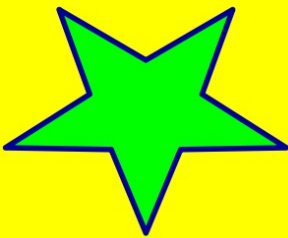
Are the equations lined up?
Do x or y have matching coefficients?
Eliminate x or y?
Are the signs the same or different?
Add or subtract?

$(5, 2)$

$$\begin{array}{r} x + 4y = 13 \\ (-) \quad x - y = 3 \\ \hline 5y = 10 \\ \frac{5}{5} \quad \frac{10}{5} \\ y = 2 \end{array}$$

$$\begin{array}{r} x - y = 3 \\ x - 2 = 3 \\ +2 \quad +2 \\ \hline x = 5 \end{array}$$

Solving Using Elimination



Are the equations lined up?
Do x or y have matching coefficients?
Eliminate x or y?
Are the signs the same or different?
Add or subtract?

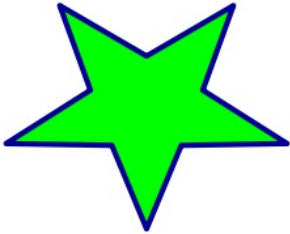
$$\begin{array}{r} 3x - 10y = 14 \\ (-) \quad 3x - 9y = 15 \\ \hline -10y + 9y = -1 \\ -1y = -1 \\ y = 1 \end{array}$$

$-10y + 9y = -1$

$(8, 1)$

$$\begin{array}{r} 3x - 9(1) = 15 \\ 3x - 9 = 15 \\ +9 +9 \\ \hline 3x = 24 \\ \frac{3}{3} \quad \frac{24}{3} \\ x = 8 \end{array}$$

Solving Using Elimination



$$4 + (-4) = 0$$

$$\underline{4 - (-4) = 8}$$

$$\begin{array}{r} (+) \ 4x + 9y = 5 \\ -4x + 7y = 11 \\ \hline \end{array}$$

$$\frac{10y = 16}{10 \quad 10}$$

$$y = 1$$

$$4x + 9(1) = 5$$

$$4x + 9 = 5$$

$$4x = -4$$

$$x = -1$$

$$(-1, 1)$$

Are the equations lined up?

Do x or y have matching coefficients?

Are the signs the same or different?

Add or subtract?

$$\begin{array}{r} (+) \ 10x - 3y = 18 \\ -2x + 3y = 6 \\ \hline \end{array}$$

$$\frac{8x = 24}{8 \quad 8}$$

$$x = 3$$

$$10(3) - 3y = 18$$

$$30 - 3y = 18$$

$$\underline{-30 \quad -30}$$

$$\frac{-3y = -12}{-3 \quad -3}$$

$$y = 4 \quad (3, 4)$$

Main Ideas/Questions	Notes/Examples
What if there are NO COMMON COEFFICIENTS?	multiply one or both equations to create common coefficients.

$$\begin{array}{l} 1. \ x + 3y = 6 \\ \quad 2x - 7y = -1 \end{array}$$

$$\begin{array}{r} 2(x + 3y = 6) \\ \cancel{2x + 6y = 12} \\ \cancel{2x - 7y = -1} \\ \hline 13y = 13 \\ \hline 13 \mid 13 \\ y = 1 \end{array}$$

$$\begin{array}{l} x + 3(1) = 6 \\ x + 3 = 6 \\ x = 3 \end{array}$$

$$(3, 1)$$

$$\begin{aligned} 3. \quad & 3x - y = 14 \\ & 5x + 4y = 12 \end{aligned}$$

$$\begin{aligned} 5(3x - y = 14) & \Rightarrow 15x - 5y = 70 \\ 3(5x + 4y = 12) & \Rightarrow 15x + 12y = 36 \end{aligned}$$

$$\begin{array}{r} 15x - 5y = 70 \\ 15x + 12y = 36 \\ \hline -17y = 34 \end{array}$$

$$\frac{-17y}{-17} = \frac{34}{-17}$$

$$y = -2$$

$$\begin{array}{r} 3x - (-2) = 14 \\ -2 \quad -2 \\ \hline 3x = 12 \end{array}$$

$$\frac{3x = 12}{3 \quad 3}$$

$$x = 4$$

$$(4, -2)$$

$$2x = 4y + 18$$

$$-5x - 6y = 3$$

$$\left. \begin{array}{l} 5(2x - 4y = 18) \\ 2(-5x - 6y = 3) \end{array} \right\}$$

$$2x = 4y + 18$$

$$\begin{array}{r} -4y \quad -4y \\ \hline \end{array}$$

$$2x - 4y = 18$$

$$(+)$$
$$10x - 20y = 90$$

$$-10x - 12y = 6$$

$$\hline -32y = 96$$

$$\frac{-32}{-32} \quad \frac{96}{-32}$$

$$y = -3$$

$$2x - 4(-3) = 18$$

$$2x + 12 = 18$$

$$2x = 6$$

$$x = 3$$

$$(3, -3)$$

