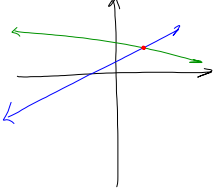


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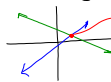
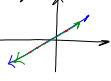
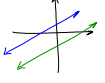
## Systems of Linear Equations

- only two Equations
- only two Variables



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## Types of Outcomes (Results) with System

- ① a Single Solution  

  - \* Different Equations
- ② Infinite Solutions  

  - \* Same Equations
- ③ No Solutions  

  - \* Parallel Lines
  - \* Same Slope
  - \* Different 'b's

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## Methods of Solving Systems

- ① Elimination/Addition

$$\begin{array}{r} \textcircled{1} \left\{ \begin{array}{l} 2x + y = 8 \\ -6x - y = 10 \\ -4x \quad \quad = 18 \end{array} \right. \\ \textcircled{2} \end{array}$$

*we have eliminated 'y'*

$$\left(-\frac{9}{2}, 17\right) \quad -4x = 18$$

$$x = -\frac{18}{4} = -\frac{9}{2}$$

$$\boxed{x = -\frac{9}{2}}$$

Now, substitute  $-\frac{9}{2}$  into either equation & solve for 'y'.

$$\begin{array}{l} \textcircled{1} 2x + y = 8 \\ 2\left(-\frac{9}{2}\right) + y = 8 \\ -9 + y = 8 \\ \boxed{y = 17} \end{array}$$

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## Check $\left(-\frac{9}{2}, 17\right)$

$$-6x - y = 10$$

$$-6\left(-\frac{9}{2}\right) - (17) = 10$$

$$27 - 17 = 10$$

$$10 = 10 \checkmark$$

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$$\begin{cases} 5x - 9y = 7 \\ -3x + 7y = -5 \end{cases}$$

## Steps Using Elimination Method

- ① Determine which variable to eliminate & eliminate it.

$$\begin{array}{r} \textcircled{1} \left\{ \begin{array}{l} 15x - 27y = 21 \\ -9x + 21y = -15 \end{array} \right. \\ \textcircled{2} \end{array}$$

$$\begin{array}{r} 15x - 27y = 21 \\ -9x + 21y = -15 \\ \hline 8y = -4 \\ \boxed{y = -\frac{1}{2}} \end{array}$$

- ② Substitute result from ① into either equation to find the other variable.

$$\begin{array}{l} \textcircled{1} -2x + 7\left(-\frac{1}{2}\right) = -5 \\ -2x - \frac{7}{2} = -5 \\ -2x = -5 + \frac{7}{2} \\ -2x = -\frac{10}{2} + \frac{7}{2} \\ -2x = -\frac{3}{2} \\ \boxed{x = \frac{3}{4}} \end{array}$$

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