



# A System of Equations Example Using All Three Methods

(Video Notes)

[Video Link](#)

# An Example Solved Using All Three Methods

- substitution
- elimination
- graphing

Solve the following system of equations using all three methods:

$$\begin{aligned} 2x - y &= 7 \\ 4x + 3y &= 9 \end{aligned}$$

**SUBSTITUTION**

$$\begin{array}{r} 2x - y = 7 \\ +y + y \\ \hline \end{array}$$

$$\begin{array}{r} 2x = 7 + y \\ -7 \quad -7 \\ \hline \end{array}$$

$$2x - 7 = y$$

} Isolated y

$$4x + 3y = 9$$

↓ sub

$$4x + 3(2x - 7) = 9$$

$$4x + 6x - 21 = 9$$

$$10x - 21 = 9$$

$$+21 \quad +21$$

$$\frac{10x}{10} = \frac{30}{10}$$

$$x = 3$$

**Solution:**  
(3, -1)

$$\begin{array}{r} 2x - y = 7 \\ 2(3) - y = 7 \end{array}$$

$$\begin{array}{r} 6 - y = 7 \\ -6 \quad -6 \\ \hline \end{array}$$

$$\frac{-y}{-1} = \frac{1}{-1} \quad y = -1$$

**ELIMINATION**

$$3(2x - y = 7) \rightarrow 6x - 3y = 21$$

$$4x + 3y = 9 \rightarrow 4x + 3y = 9$$

$$\frac{10x}{10} = \frac{30}{10}$$

$$x = 3$$

$$2x - y = 7$$

$$2(3) - y = 7$$

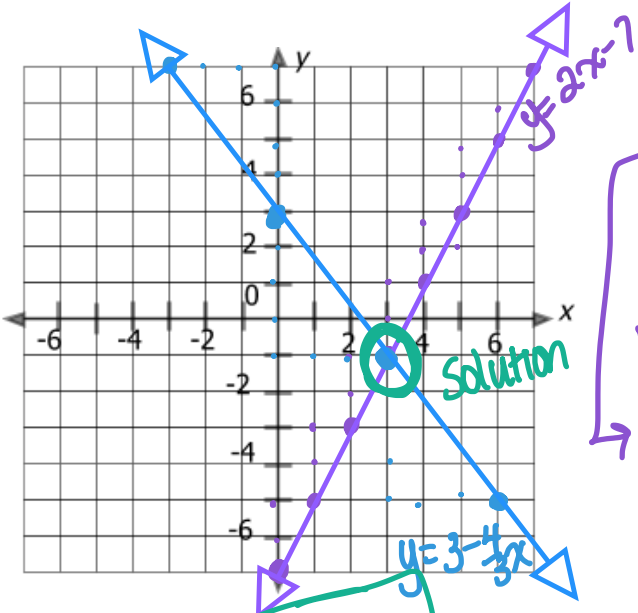
$$6 - y = 7$$

$$\frac{-y}{-1} = \frac{1}{-1}$$

$$y = -1$$

**Solution:** (3, -1)

# GRAPHING



Solution:  
(3, -1)

$$\begin{cases} 2x - y = 7 \\ 4x + 3y = 9 \end{cases}$$

$y = mx + b$   
↑  
Isolate y.

Isolated y.  
→  $y = 2x - 7$   
↑     ↑  
-1     7  
↑     ↑  
m     b  
(rise / run)

$$\begin{array}{r} 4x + 3y = 9 \\ -4x \quad -4x \\ \hline 3y = 9 - 4x \\ \frac{3y}{3} = \frac{9}{3} - \frac{4x}{3} \\ y = 3 - \frac{4}{3}x \end{array}$$

↑     ↑  
b     m

$-\frac{4}{3}$  OR  $\frac{4}{-3}$

~~$-\frac{4}{3}$~~  }  ~~$\frac{4}{-3}$~~