

Substitution

How to pick what
* to solve for x or y ?
When $x =$ or $y =$

OR Coefficients are 1 or -1

ex $y = \boxed{3x - 5}$ $y = 3(-1) - 5$
 $8x + y = -16$ $\begin{matrix} -3 - 5 \\ y = -8 \end{matrix}$

$$8x + (3x - 5) = -16$$

$$8x + 3x - 5 = -16$$

$$11x - 5 = -16$$

$$+5 +5$$

$$\frac{11x}{11} = \frac{-11}{11}$$

$$x = -1$$

$$-1, -8$$

ex $y = \boxed{-3x + 10}$
 $6x + 2y = 20$

$$6x + 2(-3x + 10) = 20$$

$$\cancel{6x} - \cancel{6x} + 20 = 20$$

$$20 = 20$$

∞
many
solutions

ex $\left\{ \begin{array}{l} x + y = 4 \\ 2x + 2y = 7 \end{array} \right.$

$$\rightarrow \begin{array}{r} x + y = 4 \\ -y \quad -y \\ \hline x = (-y + 4) \end{array}$$

$$2(-y + 4) + 2y = 7$$

$$\cancel{-2y} + 8 + \cancel{2y} = 7$$

$$\text{no solution } 8 = 7$$

$$\begin{array}{cccc} S & G & G & S \\ 4x - 49 = & -2x + 23 \\ + 2x + 49 & + 2x + 49 \end{array}$$

$$\frac{6x = 72}{6} \quad \frac{6}{6}$$

$$x = 12$$

$$\begin{array}{r} 4(12) - 49 \\ 48 - 49 \\ -1 \end{array}$$

$$(12, -1)$$

$$2. \quad 3x + 2y = -12$$

$$3x + 2(x-1) = -12$$

$$3x + 2x - 2 = -12$$

$$5x - 2 = -12$$

$$+2 \quad +2$$

$$5x = -10$$

$$x = -2$$

$$y = x - 1$$

$$-2 - 1$$

$$(-2, -3)$$

$$Ax + By = C$$

ex $\left\{ \begin{array}{l} 5x + 3y = -19 \\ 8x + 3y = -25 \end{array} \right.$

$$\begin{array}{r} 5x + 3y = -19 \\ -5x - 3y = 19 \\ \hline 3x = -4 \\ \frac{3x}{3} = \frac{-4}{3} \\ x = -\frac{4}{3} \end{array}$$

$5(-\frac{4}{3}) + 3y = -19$

$$\begin{array}{r} -\frac{20}{3} + 3y = -19 \\ +\frac{20}{3} + 3y = -19 \\ \frac{3y}{3} = \frac{-9}{3} \\ y = -3 \end{array}$$

$(-\frac{4}{3}, -3)$

ex $\left\{ \begin{array}{l} 5x + 3y = 52 \\ 9x - 4y = 56 \end{array} \right.$

$$\begin{array}{r} 20x + 12y = 208 \\ 27x - 12y = 168 \\ \hline 47x = 376 \\ \frac{47x}{47} = \frac{376}{47} \\ x = 8 \end{array}$$

$5(8) + 3y = 52$

$$\begin{array}{r} 40 + 3y = 52 \\ -40 \quad -40 \\ 3y = 12 \\ \frac{3y}{3} = \frac{12}{3} \\ y = 4 \end{array}$$

$(8, 4)$

ex $\left\{ \begin{array}{l} 5x + 6y = 45 \\ -5x - 6y = 38 \end{array} \right.$

$0 = 83$
no solution

When should I use...

Graphing:

Both equations are
in slope-intercept form

Substitution:

When you have either
 $x =$ or $y =$.

Elimination:

When both equations
are in standard form
 $Ax + By = C$