

4.2 EQ: **How DO YOU SOLVE SYSTEMS?**

SOLVE SYSTEMS BY SUBSTITUTION

* Use when one equation is **SOLVED FOR A VARIABLE** *

1) ID which variable is **ISOLATED** $x = \sim$
 $y = \sim$

2) Copy other equation with **()** where that variable appears

3) **SUBSTITUTE** & **SOLVE**

4) **SUBSTITUTE** & **SOLVE**

Examples:

1) $x = 2y + 3$
 $3x + 4y = 9$

2) $y = -2x + 3$
 $-4x - 4y = -8$

Examples:

1) $x = 2y + 3$

$3x + 4y = 9$

$$3(2y + 3) + 4y = 9$$

$$6y + 9 + 4y = 9$$

$$10y + 9 = 9$$

$$\begin{array}{r} -9 \\ -9 \end{array}$$

$$\hline \frac{10y}{10} = \frac{0}{10}$$

$$y = 0$$

$$x = 2(0) + 3 = 3$$

$$\boxed{(3, 0)}$$

2) $y = -2x + 3$

$-4x - 4y = -8$

$$-4x - 4(-2x + 3) = -8$$

$$-4x + 8x - 12 = -8$$

$$4x - 12 = -8$$

$$\begin{array}{r} +12 \\ +12 \end{array}$$

$$\hline \frac{4x}{4} = \frac{4}{4}$$

$$x = 1$$

$$y = -2(1) + 3 = 1$$

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

$$3) \quad -8x - 7y = 1$$

$$x + 4y = 3$$

$$\begin{array}{r} -4y \quad -4y \\ \hline x = 3 - 4y \\ -8(3 - 4y) - 7y = 1 \end{array}$$

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

$$4) \quad -2x + 3y = -18$$

$$5x + 7y = -13$$

$$\begin{array}{r} -2x + 3y = -18 \\ -3y \quad -3y \\ \hline -2x = -18 - 3y \\ \frac{-2}{-2} \quad \frac{-3y}{-2} \quad \frac{-18}{-2} \end{array}$$

$$x = 9 + \frac{3}{2}y$$

$$5\left(9 + \frac{3}{2}y\right) + 7y = -13$$

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

Summary: