

SOLVING SYSTEMS OF EQUATIONS BY ELIMINATION:

Both equations are in standard form.

You adjust each equation as needed to eliminate one of the variables. You decide which variable is easier to eliminate. You will add the 2 equations once you have set it up.

*** You must find x and y.

Don't do anything:

$$4x + 6y = 8$$

$$2x - 6y = 4 \quad \text{*The y's will cancel if you add. Don't change anything.}$$

$$\begin{array}{r} \text{-----} \\ 6x = 12 \end{array}$$

$x = 2$ Substitute 2 in for x and find y.

$y = 0$. The solution is (2,0). **CHECK IT!**

$$x = 0$$

$$\begin{array}{r} 4x + 6y = 8 \\ + \quad 2x - 6y = 4 \\ \hline 6x = 12 \\ x = 2 \end{array}$$

solve for x and y . Check

$$\textcircled{a} \begin{array}{r} 4x - 2y = 7 \\ + \quad x + 2y = 3 \\ \hline \end{array}$$

$$4(2) - 2\left(\frac{1}{2}\right) = 7$$

$$8 - 1 = 7 \quad \checkmark$$

$$2 + 2\left(\frac{1}{2}\right) = 3 \quad \checkmark$$

$$\begin{array}{r} 5x = 10 \\ \hline x = 2 \end{array} \quad \begin{array}{r} 2 + 2y = 3 \\ -2 \\ \hline 2y = 1 \\ y = \frac{1}{2} \end{array}$$

$$\textcircled{b} \begin{array}{r} 3x - 2y = 14 \\ 2x + 2y = 6 \\ \hline 5x = 20 \\ \hline x = 4 \end{array} \quad \begin{array}{r} 3(4) - 2y = 14 \\ -2y = 2 \\ \hline y = -1 \end{array}$$

$$3(4) - 2(-1) = 14 \quad \checkmark$$

$$2(4) + 2(-1) = 6 \quad \checkmark$$

Multiply 1 Equation:

$$\begin{array}{r} 4x + 4y = 6 \\ + \\ -2(2x + 5y = 12) \end{array}$$

① you make it work!

② * Multiply the whole equation

$$\begin{array}{r} \hline 4x + 4y = 6 \\ + \\ -4x - 10y = -24 \\ \hline \end{array}$$

③ * Rewrite it

$$-6y = -18$$

$$y = 3$$

* Plug into original equation

$$4x + 4y = 6 \quad 4(-1.5) + 4(3) = 6 \checkmark$$

$$2x + 5y = 12 \quad 2(-1.5) + 5(3) = 12 \checkmark$$

$$\cancel{x = 3}$$

$$4x + 4(3) = 6$$

$$4x + 12 = 6$$

$$\begin{array}{r} 4x = -6 \\ \hline 4 \end{array}$$

$$\cancel{x = -1.5}$$

$$\begin{array}{r}
 4x + 9y = 1 \\
 -1(4x + 6y = -2) \\
 \hline
 \end{array}
 \quad
 \begin{array}{r}
 4(-2) + 9(1) = 1 \checkmark \\
 4(-2) + 6(1) = -2 \checkmark
 \end{array}$$

$$\begin{array}{r}
 + 4x + 9y = 1 \\
 -4x - 6y = 2 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 3y = 3 \\
 \textcircled{x=1}
 \end{array}$$

$$\begin{array}{r}
 4x + 9(1) = 1 \\
 4x + 9 = 1 \\
 -9 \quad -9 \\
 4x = -8 \\
 \textcircled{x=-2}
 \end{array}$$

Multiply Both Equations:

$$2x + 2y = 6$$

$3x + 5y = 12$ Choose which variable you want to eliminate. I will get rid of x.

$$\begin{array}{r} 3(2x + 2y = 6) \\ + \\ -2(3x + 5y = 12) \end{array} \Rightarrow + \begin{array}{r} 6x + 6y = 18 \\ -6x - 10y = -24 \\ \hline \end{array}$$

$$2x + 2\left(\frac{3}{2}\right) = 6$$

$$2x + 3 = 6$$

$$2x = 3$$

$$x = \frac{3}{2} = 1\frac{1}{2}$$

$$\frac{-4}{-4}y = \frac{-8}{-4}$$

$$y = \frac{3}{2} = 1\frac{1}{2}$$

$$2x + 2y = 6$$

$$3x + 5y = 12$$

$$2(1.5) + 2(1.5) = 6 \checkmark$$

$$3(1.5) + 5(1.5) = 12$$

$$4.5 + 7.5 = 12 \checkmark$$

