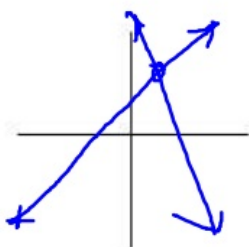


Warm-up: after Section 4.1

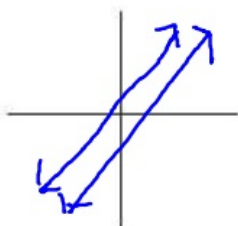
Name: _____
 Period: _____

1. Systems of Linear Equations have 3 possible types of solutions
Draw a sketch of two lines for each situation

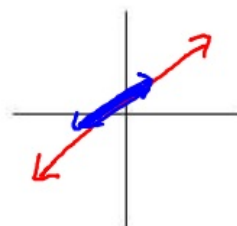
One solution



No Solutions



Infinitely Many Solutions



Graph.

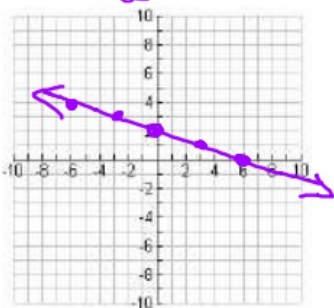
2. $x+3y=6$

$$3y = -x + 6$$

$$y = -\frac{1}{3}x + 2$$

$$m = \frac{-1}{3} = -\frac{1}{3}$$

$$b = 2$$



Solve for y, then solve the system graphically.

3. $\begin{cases} x-y=2 \\ -2x+3y=3 \end{cases}$

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

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

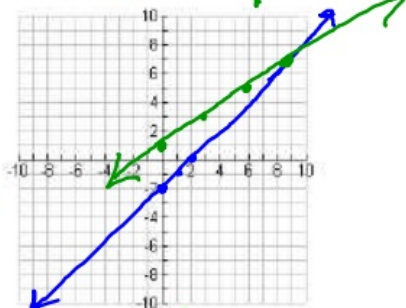
$$y = x-2 \quad y = \frac{2}{3}x+1$$

$$m = \frac{1}{1} = 1$$

$$b = -2$$

$$m = \frac{2}{3}$$

$$b = 1$$



Solution (9, 7)

4. $\begin{cases} 4x-6y=12 \\ -2x+3y=3 \end{cases}$

$$-6y = -4x + 12 \quad 3y = 2x + 3$$

$$y = \frac{4}{6}x - 2 \quad y = \frac{2}{3}x + 1$$

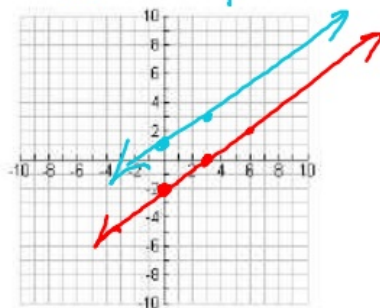
$$y = \frac{2}{3}x - 2$$

$$m = \frac{2}{3}$$

$$b = -2$$

$$m = \frac{2}{3}$$

$$b = 1$$



Solution (,)

no solution

Two methods for algebraically Solving Systems of Linear Equations

- (1) Substitution Method
- (2) Elimination Method (sometimes called: Linear Combination Method)

(1) Substitution Method

Example #1 Graph $\begin{cases} y = -2x + 6 \\ 3x + 4y = 4 \end{cases}$

$y = -2x + 6$
 $m = -\frac{2}{1}$
 $b = 6$

$3x + 4y = 4$
 $4y = -3x + 4$
 $y = -\frac{3}{4}x + 1$
 $m = -\frac{3}{4}$
 $b = 1$

Solution Point (4 , -2)

Now use substitution to solve: $\begin{cases} y = -2x + 6 \\ 3x + 4y = 4 \end{cases}$

$3x + 4(-2x + 6) = 4$
 $3x - 8x + 24 = 4$
 $-5x + 24 = 4$
 $-5x = -20$
 $x = 4$

$y = -2(4) + 6$
 $y = -8 + 6$
 $y = -2$

Solution Point (4 , -2)

Example #2 Use substitution to solve: $\begin{cases} 5x + 6y = 14 \\ x - 3y = 7 \end{cases}$

$x - 3y = 7$
 $x = 3y + 7$

$5(3y + 7) + 6y = 14$
 $15y + 35 + 6y = 14$
 $21y + 35 = 14$
 $21y = -21$
 $y = -1$

$x = 3(-1) + 7$
 $x = -3 + 7$
 $x = 4$

Solution Point (4 , -1)

Example #3 Use substitution to solve: $\begin{cases} x + y = -2 \\ -3x + y = 6 \end{cases}$

$x + y = -2$
 $x = -y - 2$

$-3(-y - 2) + y = 6$
 $3y + 6 + y = 6$
 $4y + 6 = 6$
 $\frac{-6 \quad -6}{4y = 0}$
 $y = 0$

$x = -(0) - 2$
 $x = -2$

Solution Point (-2 , 0)

(2) Elimination Method (also called *Linear Combination Method*)

Example #4 Find the solution point using *elimination*.

$$\begin{cases} 2x + 10y = 10 \\ -2x - 8y = -8 \end{cases}$$
$$\begin{array}{r} 2x + 10y = 10 \\ + \quad -2x - 8y = -8 \\ \hline 2y = 2 \\ y = 1 \end{array}$$
$$\begin{array}{l} -2x - 8(1) = -8 \\ -2x - 8 = -8 \\ -2x = 0 \\ x = 0 \end{array}$$

Solution Point (0 , 1)

Example #5 Find the solution point using *elimination*.

$$\begin{cases} 6x - 8y = -2 \\ -3x + 2y = 0 \end{cases}$$
$$\begin{array}{r} 6x - 8y = -2 \\ 4(-3x + 2y = 0) \\ \hline -6x = -2 \\ x = \frac{1}{3} \end{array}$$
$$\begin{array}{l} 2\left(\frac{1}{3}\right) - 8y = -2 \\ 2 - 8y = -2 \\ -8y = -4 \\ y = \frac{-4}{-8} \\ y = \frac{1}{2} \end{array}$$

Solution Point ($\frac{1}{3}$, $\frac{1}{2}$)

Example #6 Find the solution point using *elimination*.

$$\begin{cases} -x + 3y = -6 \\ 4x - 12y = 24 \end{cases}$$
$$\begin{array}{r} -4x + 12y = -24 \\ 4x - 12y = 24 \\ \hline 0 = 0 \\ \text{inf. many solutions} \end{array}$$

Solution Point (,)

Homework!!

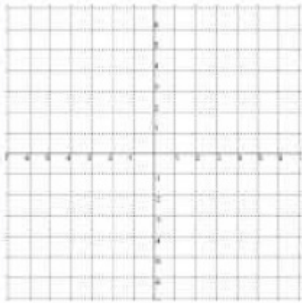
Worksheet *odd problems only*

Two methods for algebraically Solving Systems of Linear Equations

- (1) Substitution Method
- (2) Elimination Method (sometimes called: Linear Combination Method)

(1) Substitution Method

Example #1 Graph $\begin{cases} y = -2x + 6 \\ 3x + 4y = 4 \end{cases}$



Solution Point (,)

Now use substitution to solve: $\begin{cases} y = -2x + 6 \\ 3x + 4y = 4 \end{cases}$

Solution Point (,)

Example #2 Use substitution to solve: $\begin{cases} 5x + 6y = 14 \\ x - 3y = 7 \end{cases}$

Solution Point (,)

Example #3 Use *substitution* to solve: $\begin{cases} x + y = -2 \\ -3x + y = 6 \end{cases}$

Solution Point (,)

(2) Elimination Method *(also called Linear Combination Method)*

Example #4 Find the solution point using *elimination*.

$$\begin{cases} 2x + 10y = 10 \\ -2x - 8y = -8 \end{cases}$$

Solution Point (,)

Example #5 Find the solution point using *elimination*.

$$\begin{cases} 6x - 8y = -2 \\ -3x + 2y = 0 \end{cases}$$

Solution Point (,)

Example #6 Find the solution point using *elimination*.

$$\begin{cases} -x + 3y = -6 \\ 4x - 12y = 24 \end{cases}$$

Solution Point (,)

Homework!!

Worksheet *odd problems only*