

Do Now:

Directions: Consider the following compound sentence: $x + y = 10$ and $y = 2x + 1$.

1. **Circle** all the ordered pairs (x, y) that are solutions to the equation $x + y = 10$.

(3,7) (7,3) (0,1) (12,25) (5,11) (-1,-1)

2. **Underline** all the ordered pairs (x, y) that are solutions to the equation $y = 2x + 1$.

(3,7) (7,3) (0,1) (12,25) (5,11) (-1,-1)

3. List the ordered pair(s) (x, y) from above that are solutions to the compound sentence $x + y = 10$ and $y = 2x + 1$.

(3,7)

$$\begin{aligned} x + y &= 10 \\ 3 + 7 &= 10 \\ 10 &= 10 \checkmark \end{aligned}$$

$$\begin{aligned} y &= 2x + 1 \\ 7 &= 2(3) + 1 \\ 7 &= 7 \checkmark \end{aligned}$$

AIM: Solving Systems of Equations Graphically

4. Graph $x + y = 10$ and $y = 2x + 1$ on the same set of coordinate axes.

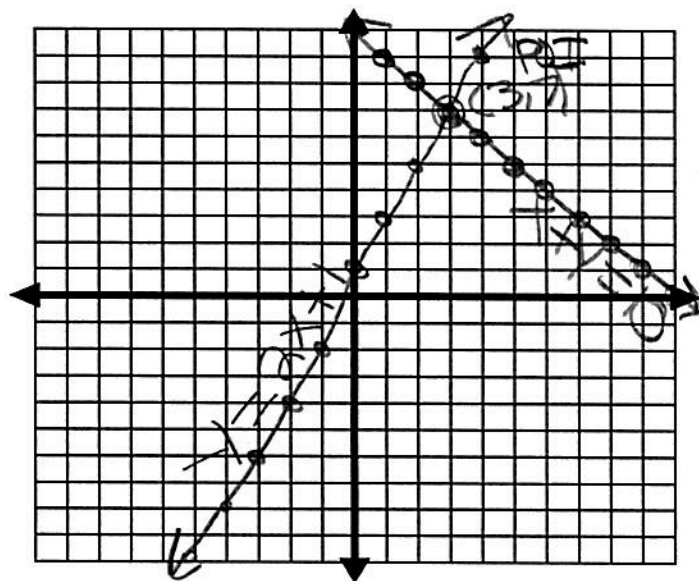
- a. Circle the point that lies on BOTH lines.

- b. What is this point called? *Point of intersection*

- c. What is the solution set to $x + y = 10$ and $y = 2x + 1$? *(3,7)*

$$\begin{aligned} x + y &= 10 \\ -x &\quad -x \\ \hline y &= -x + 10 \\ m &= -\frac{1}{1} \downarrow \\ b &= 10 \end{aligned}$$

$$\begin{aligned} y &= 2x + 1 \\ m &= \frac{2}{1} \uparrow \\ b &= 1 \end{aligned}$$



5. On the set of axes below, solve the following system of equations graphically. State the coordinates of the solution.

$$4x - 2y = 10$$

$$y = -2x - 1$$

$$4x - 2y = 10$$

$$\begin{array}{r} -4x \\ \hline -2y = -4x + 10 \\ \hline \end{array}$$

$$y = 2x - 5$$

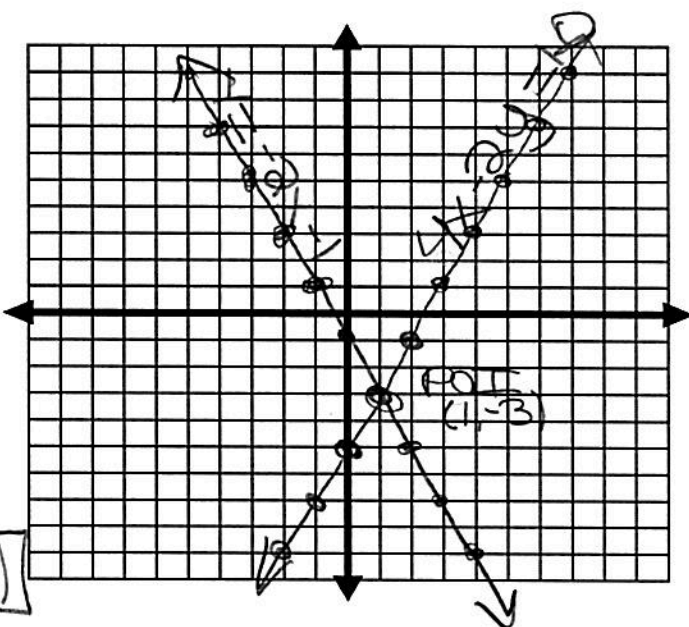
$$m = \frac{2}{1} \uparrow \quad b = -5$$

Solution (1, -3)

$$y = -2x - 1$$

$$m = -\frac{2}{1} \downarrow$$

$$b = -1$$



check:

$$4x - 2y = 10$$

$$4(1) - 2(-3) = 10$$

$$4 + 6 = 10$$

$$10 = 10 \checkmark$$

check:

$$y = -2x - 1$$

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

$$-3 = -2 - 1$$

$$-3 = -3 \checkmark$$

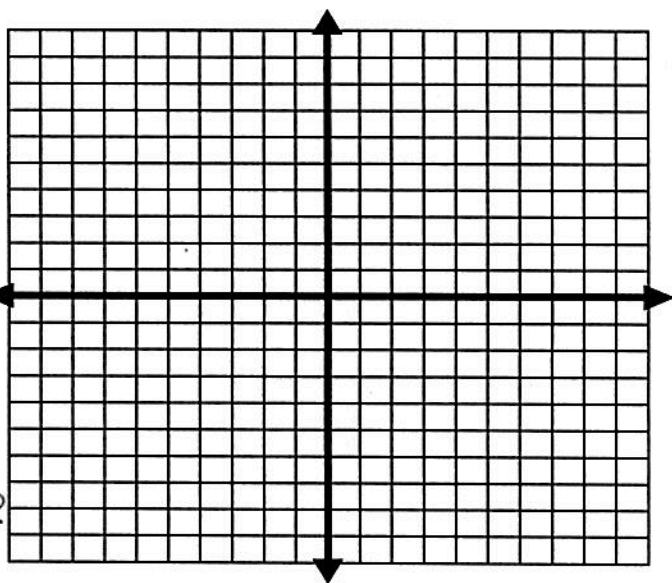
6. When solved graphically, which system of equations will have exactly one point of intersection?

1) $y = -x - 20$ $m = -1$
 $y = x + 17$ $m = 1$

2) $y = 0.5x + 30$ $m = \frac{1}{2}$
 $y = 0.5x - 30$ $m = \frac{1}{2}$

3) $y = \frac{3}{5}x + 12$ $m = \frac{3}{5}$
 $y = 0.6x - 19$ $m = \frac{3}{5}$

4) $y = -x + 15$ $m = -1$
 $y = -x + 25$ $m = -1$



If lines share the same slopes, then they are parallel. Parallel lines never intersect: never have the same solution.

7. On the set of axes below, solve the following system of equations graphically. State the coordinates of the solution.

$$y - 4x = -1$$

$$y - 8 = -\frac{1}{2}x$$

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

$$y = 4x - 1$$

$$m = \frac{4}{1} \rightarrow$$

$$b = -1$$

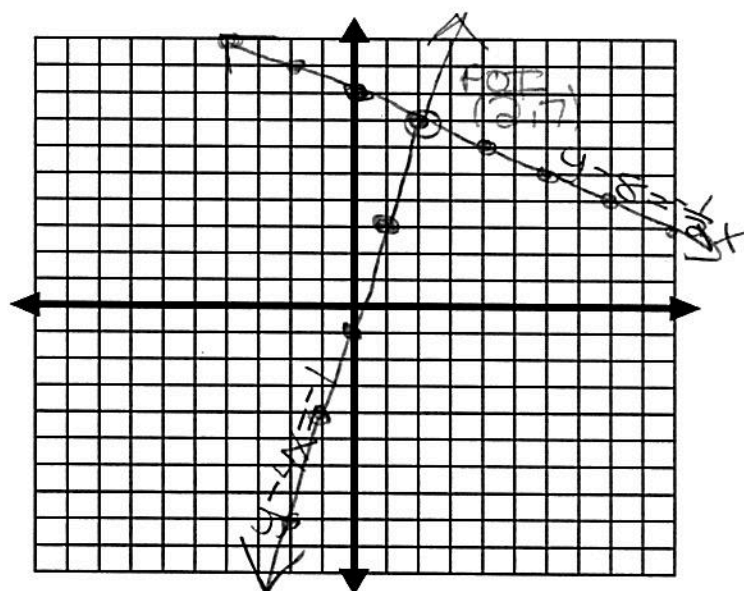
$$\begin{array}{r} y - 8 = -\frac{1}{2}x \\ +8 \quad +8 \\ \hline \end{array}$$

$$y = -\frac{1}{2}x + 8$$

$$m = -\frac{1}{2} \rightarrow$$

$$b = 8$$

Solution (2, 7)



8. On the set of axes below, solve the following system of equations graphically. State the coordinates of the solution.

$$y - x = 1$$

$$y + 2x = 10$$

$$\begin{array}{r} y - x = 1 \\ +x \quad +x \\ \hline \end{array}$$

$$y = x + 1$$

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

$$b = 1$$

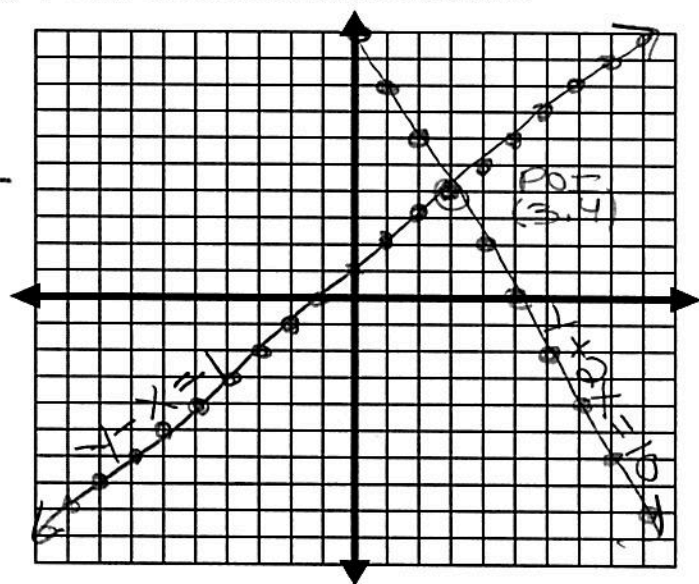
$$\begin{array}{r} y + 2x = 10 \\ -2x \quad -2x \\ \hline \end{array}$$

$$y = -2x + 10$$

$$m = -\frac{2}{1} \rightarrow$$

$$b = 10$$

Solution (3, 4)



9. Explain what it means to solve systems of equations graphically.

Graph both equation to determine where both lines share the same solution. The point of intersection.