Lesson 25: Geometric Interpretation of the Solutions of a Linear System

Classwork

Exploratory Challenge/Exercises 1–5

1. Sketch the graphs of the linear system on a coordinate plane: $\begin{cases} 2y + x = 12 \\ y = \frac{5}{6}x - 2 \end{cases}$

$y = \frac{5}{6}x - 2$

$m = \frac{5}{6}$

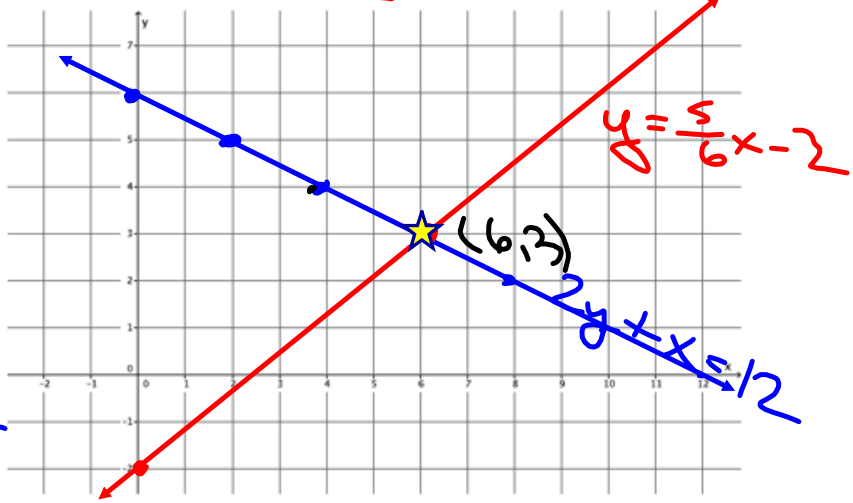
$b = -2$

$2y + x = 12$

$-x \quad -x$

$\frac{2y}{2} = \frac{-1x + 12}{2}$

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



a. Name the ordered pair where the graphs of the two linear equations intersect.

(6,3)

x y

b. Verify that the ordered pair named in part (a) is a solution to $2y + x = 12$.

$2(3) + 6 = 12$

$6 + 6 = 12$

$12 = 12$ ✓

c. Verify that the ordered pair named in part (a) is a solution to $y = \frac{5}{6}x - 2$.

$3 = \frac{5}{6}(6) - 2 \rightarrow 3 = 3$ ✓

$3 = 5 - 2$

d. Could the point $(4, 4)$ be a solution to the system of linear equations? That is, would $(4, 4)$ make both equations true? Why or why not?

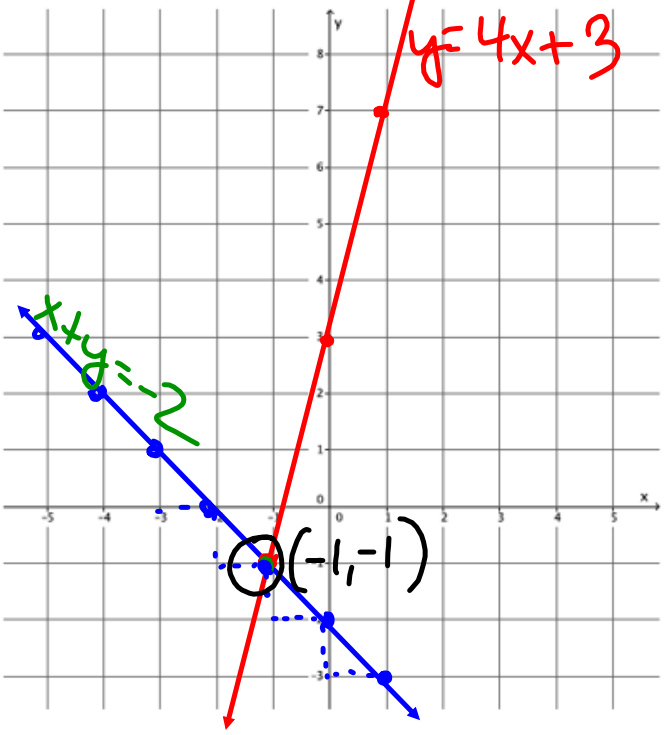
- No, there can only be 1 solution

OR

- No, because it doesn't cross at (4,4)

2. Sketch the graphs of the linear system on a coordinate plane: $\begin{cases} x+y=-2 \\ y=4x+3 \end{cases}$

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



a. Name the ordered pair where the graphs of the two linear equations intersect.

x y
$(-1, -1)$

b. Verify that the ordered pair named in part (a) is a solution to $x + y = -2$.

$-1+-1=-2$
$-2=-2$ ✓ :)

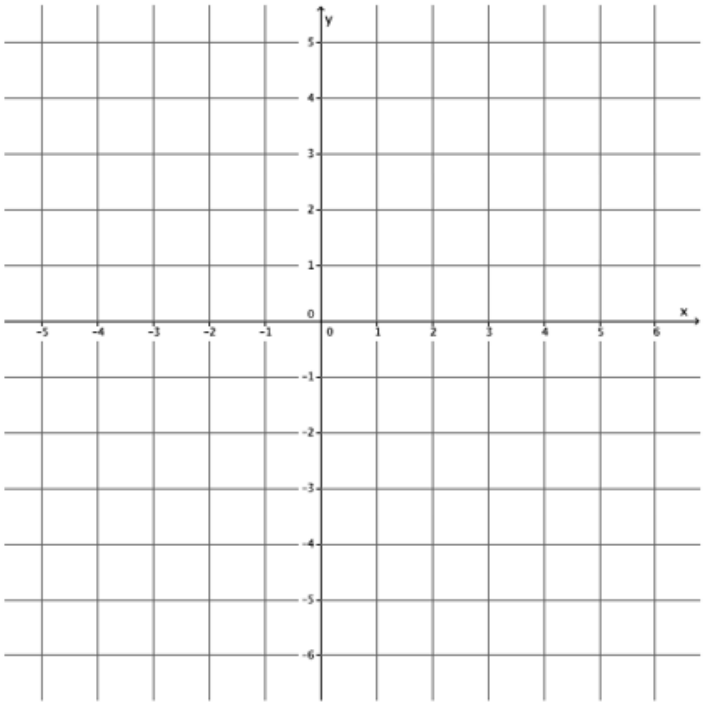
c. Verify that the ordered pair named in part (a) is a solution to $y = 4x + 3$.

$-1=4(-1)+3$
$-1=-4+3$
$-1=-1$ ✓ :)

d. Could the point $(-4, 2)$ be a solution to the system of linear equations? That is, would $(-4, 2)$ make both equations true? Why or why not?

No, there can only be 1 solution!

3. Sketch the graphs of the linear system on a coordinate plane: $\begin{cases} 3x + y = -3 \\ -2x + y = 2 \end{cases}$



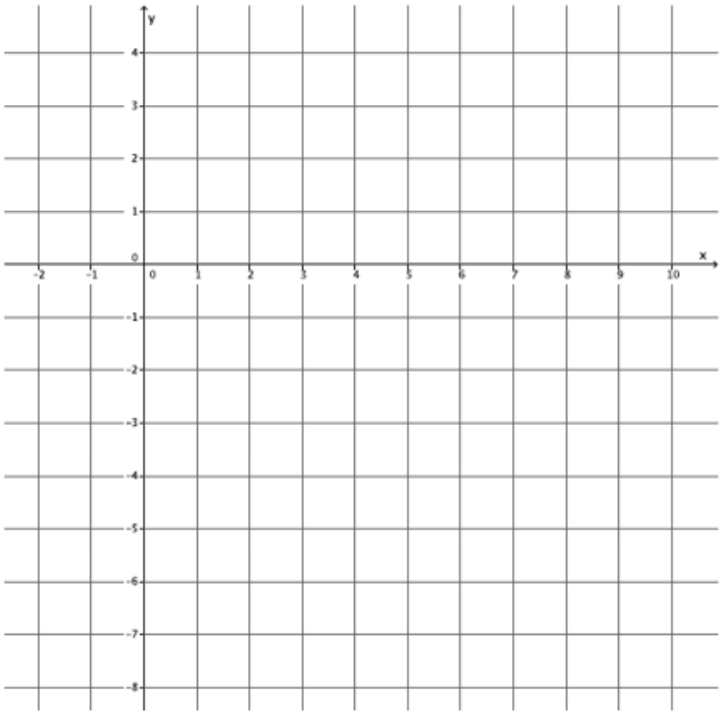
a. Name the ordered pair where the graphs of the two linear equations intersect.

b. Verify that the ordered pair named in part (a) is a solution to $3x + y = -3$.

c. Verify that the ordered pair named in part (a) is a solution to $-2x + y = 2$.

d. Could the point $(1, 4)$ be a solution to the system of linear equations? That is, would $(1, 4)$ make both equations true? Why or why not?

4. Sketch the graphs of the linear system on a coordinate plane: $\begin{cases} 2x - 3y = 18 \\ 2x + y = 2 \end{cases}$.



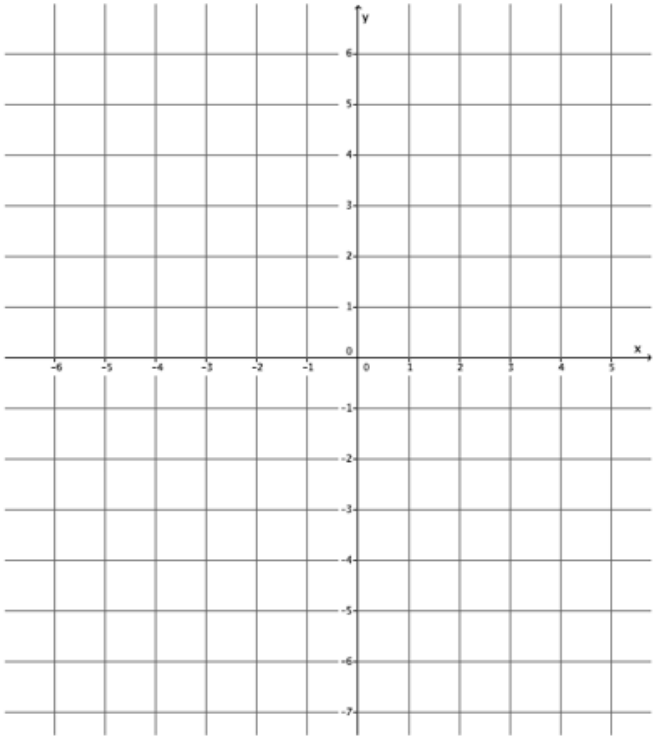
a. Name the ordered pair where the graphs of the two linear equations intersect.

b. Verify that the ordered pair named in part (a) is a solution to $2x - 3y = 18$.

c. Verify that the ordered pair named in part (a) is a solution to $2x + y = 2$.

d. Could the point $(3, -1)$ be a solution to the system of linear equations? That is, would $(3, -1)$ make both equations true? Why or why not?

5. Sketch the graphs of the linear system on a coordinate plane: $\begin{cases} y - x = 3 \\ y = -4x - 2 \end{cases}$



a. Name the ordered pair where the graphs of the two linear equations intersect.

b. Verify that the ordered pair named in part (a) is a solution to $y - x = 3$.

c. Verify that the ordered pair named in part (a) is a solution to $y = -4x - 2$.

d. Could the point $(-2, 6)$ be a solution to the system of linear equations? That is, would $(-2, 6)$ make both equations true? Why or why not?

Exercise 6

6. Write two different systems of equations with $(1, -2)$ as the solution.