Lesson 26: Characterization of Parallel Lines

$y = mx + b$

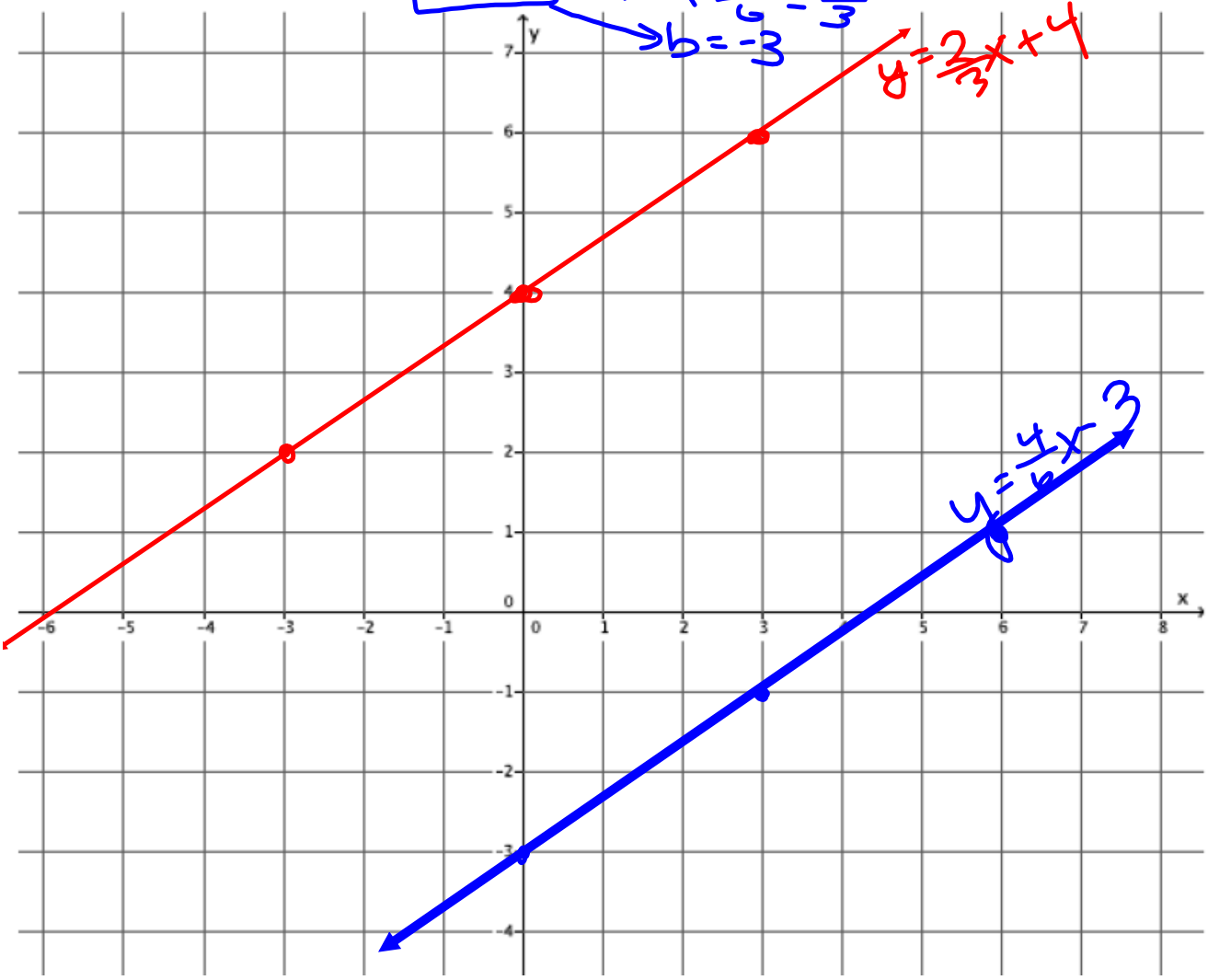
Classwork

Exercises

1. Sketch the graphs of the system. $\begin{cases} y = \frac{2}{3}x + 4 \\ y = \frac{4}{6}x - 3 \end{cases}$

$m = \frac{2}{3}$, $b = 4 \rightarrow (0, 4)$

$m = \frac{4}{6} = \frac{2}{3}$, $b = -3$



a. Identify the slope of each equation. What do you notice?

$m = \frac{2}{3}$, $m = \frac{4}{6} = \frac{2}{3}$ } They are equal!

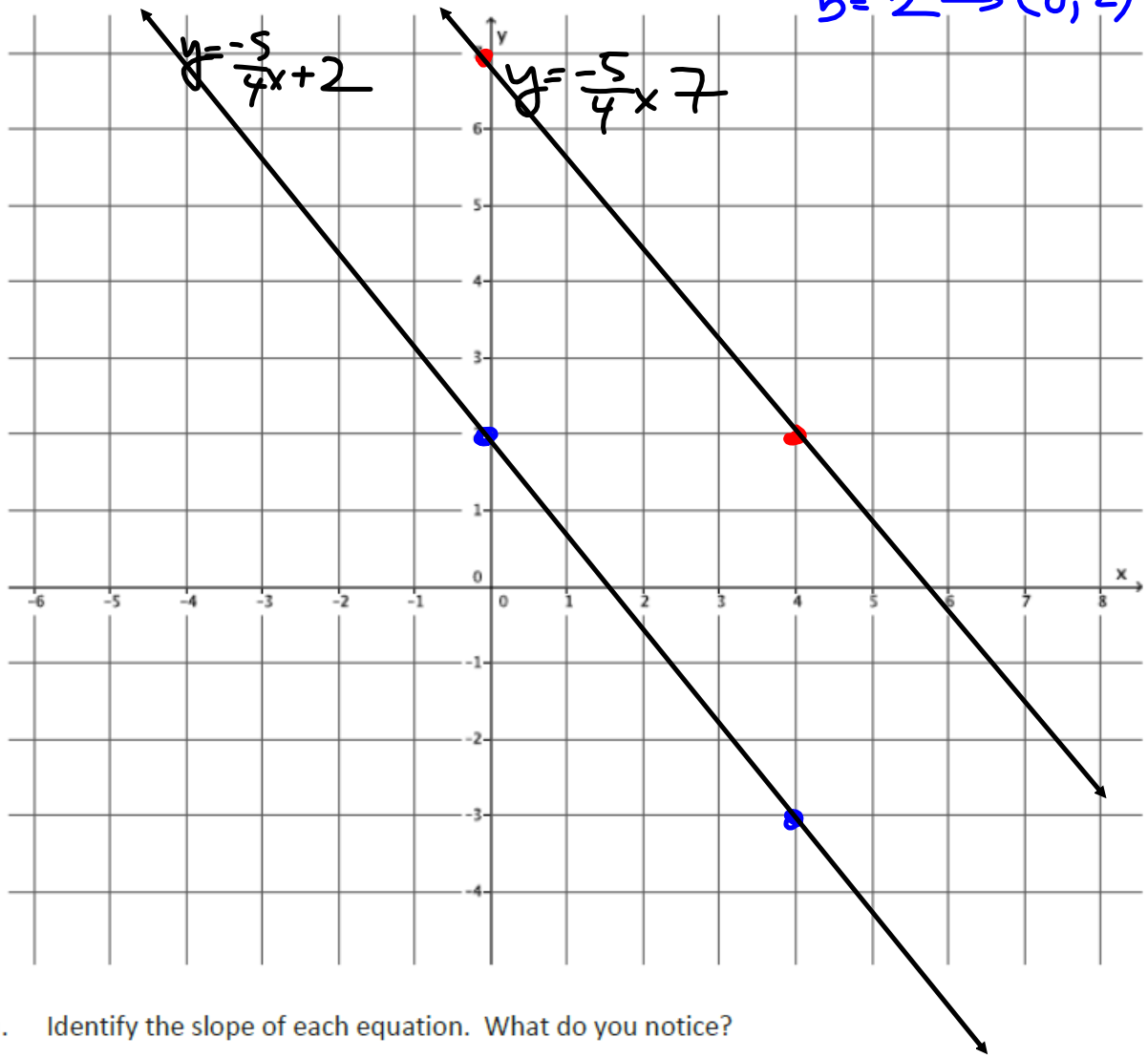
b. Identify the y-intercept point of each equation. Are the y-intercept points the same or different?

$b = 4$, $b = -3$ } They are different

2. Sketch the graphs of the system. $\begin{cases} y = -\frac{5}{4}x + 7 \\ y = -\frac{5}{4}x + 2 \end{cases}$

$m = -\frac{5}{4}$, $b = 7 \rightarrow (0,7)$

$m = -\frac{5}{4}$, $b = 2 \rightarrow (0,2)$



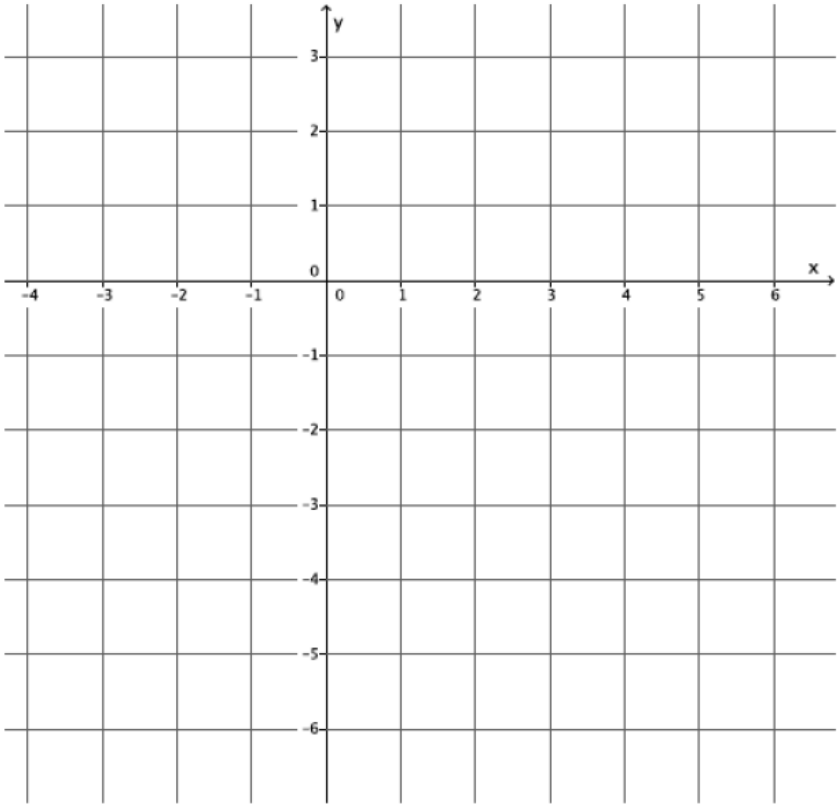
a. Identify the slope of each equation. What do you notice?

$m = -\frac{5}{4}$, They do not intersect

b. Identify the y-intercept point of each equation. Are the y-intercept points the same or different?

(0,7) and (0,2) They are different!

3. Sketch the graphs of the system. $\begin{cases} y = 2x - 5 \\ y = 2x - 1 \end{cases}$



a. Identify the slope of each equation. What do you notice?

b. Identify the y-intercept point of each equation. Are the y-intercept points the same or different?

4. Write a system of equations that has no solution.

$y = \frac{7}{11}x + 45$

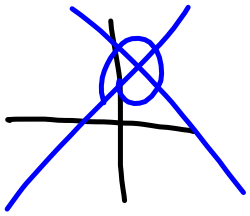
$y = \frac{7}{11}x + 23$

same and different = no solution!

5. Write a system of equations that has (2, 1) as a solution.

$6x + 2y = 14$

$12x + 5y = 29$



6. How can you tell if a system of equations has a solution or not?

- If slopes are the same and y-intercepts are different, then there is no solution (Parallel lines)
- If slopes are different, then 1 solution! (lines cross)
- If slopes are same and y-intercepts are the same, then there are an infinite number of solutions.

lines are on top of each other!

7. Does the system of linear equations shown below have a solution? Explain.

$\begin{cases} 6x - 2y = 5 \\ 4x - 3y = 5 \end{cases}$

$6x - 2y = 5$
$-6x \quad -6x$
$-2y = -6x + 5$
$-2 \quad -2 \quad -2$
$y = 3x - \frac{5}{2}$

$4x - 3y = 5$
$-4x \quad -4x$
$-3y = -4x + 5$
$-3 \quad -3 \quad -3$
$y = \frac{4}{3}x - \frac{5}{3}$

Yes!

b/c slopes are different.

8. Does the system of linear equations shown below have a solution? Explain.

$\begin{cases} -2x + 8y = 14 \\ x = 4y + 1 \end{cases}$

9. Does the system of linear equations shown below have a solution? Explain.

$$\begin{cases} 12x + 3y = -2 \\ 4x + y = 7 \end{cases}$$

10. Genny babysits for two different families. One family pays her $6 each hour and a bonus of $20 at the end of the night. The other family pays her $3 every half hour and a bonus of $25 at the end of the night. Write and solve the system of equations that represents this situation. At what number of hours do the two families pay the same for babysitting services from Genny?