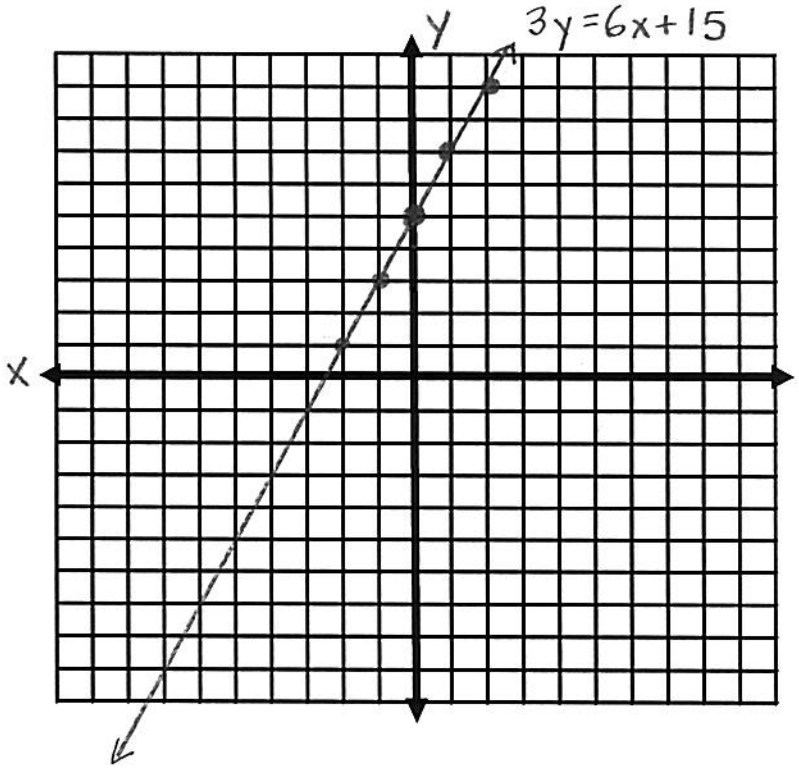
8 Algebra CC **7-1**

Essential Question: What relationships can we discover between parallel and perpendicular lines?

Do Now: **Graph each linear function below using the slope-intercept method. Check your work with your graphing calculator.**

A) $\frac{3y}{3} = \frac{6x}{3} + \frac{15}{3}$

$y = 2x + 5$



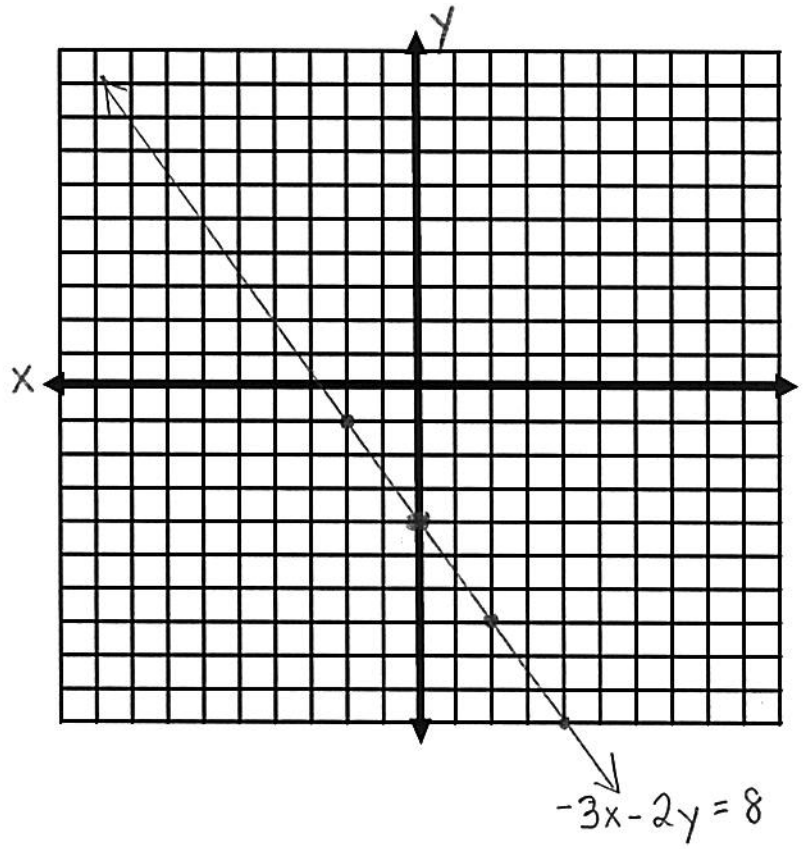
(b) y-intercept: (0, 5)

(m) slope: $\frac{2\uparrow}{1\rightarrow}$

B) $-3x - 2y = 8$

$\frac{-2y}{-2} = \frac{3x}{-2} + \frac{8}{-2}$

$y = -\frac{3}{2}x - 4$



(b) y-intercept: (0, -4)

(m) slope: $\frac{-3\downarrow}{2\rightarrow}$

Investigating the Slope and Y-intercept of Linear Relationships

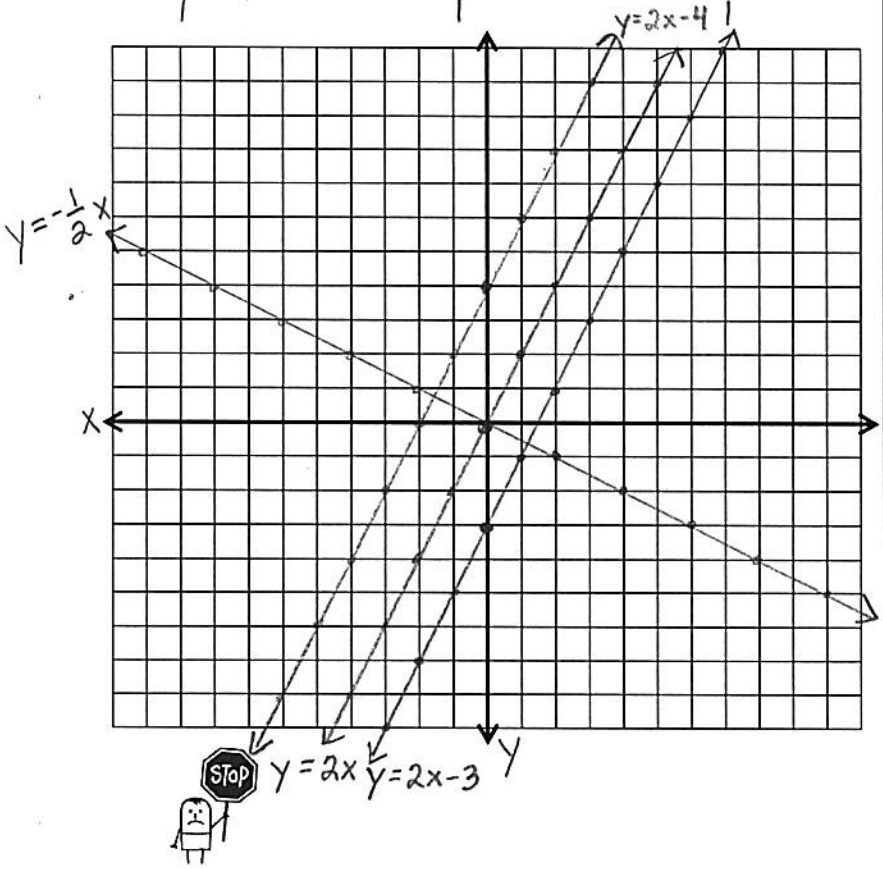
Turn and Talk

On the same set of axes, graph the following 3 lines. Analyze the lines and complete a – c.

y = 2x m= $\frac{2}{1}$ b= 0

y = 2x – 3 m= $\frac{2}{1}$ b= -3

y = 2x + 4 m= $\frac{2}{1}$ b= 4



Think about this...

a) Compare and contrast the lines. What's the same? What's different?

The lines have the same slope. They have different y-intercepts.

b) Can a conclusion be made about the relationship of the lines and their slopes?

The lines are parallel. Parallel lines have the same slope.

c) What does the y-intercept of each line determine?

The y-intercept is where the line crosses the y-axis.

Graph $y = -\frac{1}{2}x$ on the coordinate plane above. $m = -\frac{1}{2}$ $b = 0$

- Does this line intersect the other lines above? In what way? Yes, the line intersects the other lines. It is perpendicular (forms 90° angles) to the other line
- What is the relationship between the slopes of the 3 lines above and the slope of $y = -\frac{1}{2}x$?

slope of 2 and slope of $-\frac{1}{2}$ The slopes of perpendicular lines are opposite reciprocals.

The TAKE AWAY

Parallel lines have same slope and different y-intercepts.

Perpendicular lines have slopes that are opposite reciprocals.