

## Slope and $y$ -intercept

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**Strand:** Patterns, Functions, and Algebra

**Topic:** Recognize and describe the graph of a linear function.

**Primary SOL:** 8.16 The student will

- recognize and describe the graph of a linear function with a slope that is positive, negative, or zero;
- identify the slope and  $y$ -intercept of a linear function given a table of values, a graph, or an equation in  $y = mx + b$  form;

**Related SOL:** 6.12, 7.10, 8.15

### Materials

- Teacher-made slope foldable (example: [http://rpdp.net/admin/images/uploads/resource\\_8921.pdf](http://rpdp.net/admin/images/uploads/resource_8921.pdf))
- Scissors
- Slope-Intercept Cards (attached)
- Silent Bingo Game Card (attached)
- Graph paper (optional)

### Vocabulary

*coordinate plane* (earlier grades)

*dependent variable, equation of a line, linear function, negative slope, positive slope, rate of change, slope,  $y$ -intercept* (8.16a, 8.16b)

### Student/Teacher Actions: What should students be doing? What should teachers be doing?

- Create a tab foldable with the class. The tabs should display definition, positive slope, negative slope, zero slope, and no slope. Go through the foldable and explain each concept: positive slope, negative slope, zero slope, and no slope.
- Give each student a pair of scissors and the Slope-Intercept Cards. Have students cut the cards apart and match the cards to make sets of five cards each—equation in standard form, equation in slope-intercept form,  $m$  (slope),  $b$  ( $y$ -intercept), and graph.
- Distribute copies of the Bingo Game Card. Have students play the Bingo game individually. As the teacher calls out a number for slope or a number for  $y$ -intercept, students will put a mark beside that equation. Tell them they can only check one equation at a time. Whenever a student gets “Bingo,” check his/her game card.

### Assessment

- Questions**
  - Write whether a slope is positive, negative, zero, or undefined.
  - Write the slope and  $y$ -intercept of a graph.

- Write the slope and  $y$ -intercept of a table of values.
- Write the slope and  $y$ -intercept of an equation.
- **Journal/Writing Prompts**
  - Write the formula for a linear function, and identify and describe what  $m$  and  $b$  stand for. Create an example in your explanation.
  - Write about lines with undefined slope (vertical lines) and compare undefined slope to lines with a defined slope.
  - Explain why the graph of a horizontal line does not have an  $x$ -intercept, assuming the equation is not  $x = 0$ . Describe how you know this.
  - Explain why the graph of a vertical line does not have a  $y$ -intercept, assuming the equation is not  $y = 0$ . Describe how you know this.
- **Other**
  - Have students create a design on graph paper using 10 straight lines. Have them give the design to a partner, who will determine the slope and  $y$ -intercept of each line.
  - Graph a linear function, given an equation using different methods.

**Strategies for Differentiation**

- Encourage the use of graph paper and dry-erase boards with grids for students to see the slope and intercepts.
- Laminate the *Slope-Intercept Cards* so students can write on the cards with dry-erase markers.
- Have students work in pairs for both activities, as needed.

**Note: The following pages are intended for classroom use for students as a visual aid to learning.**

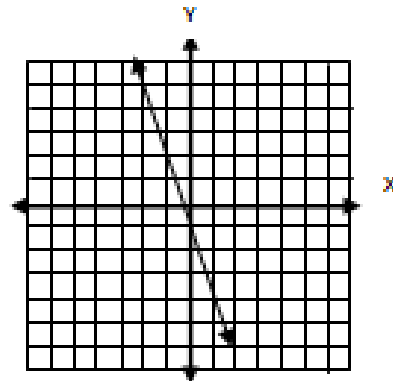
### Slope-Intercept Cards

Copy on card stock and cut out.

$$y = -3x - 1$$

$$m = -3$$

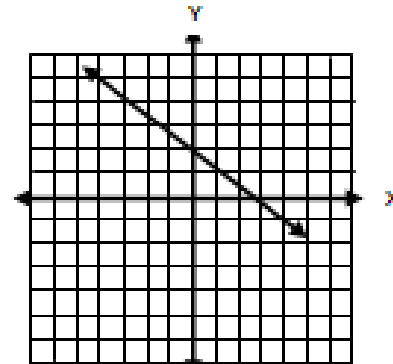
$$b = -1$$



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

$$m = -\frac{3}{4}$$

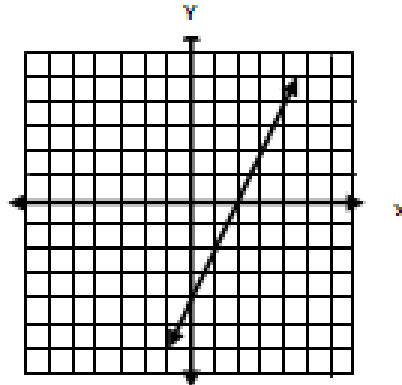
$$b = 2$$



$$y = 2x - 4$$

$$m = 2$$

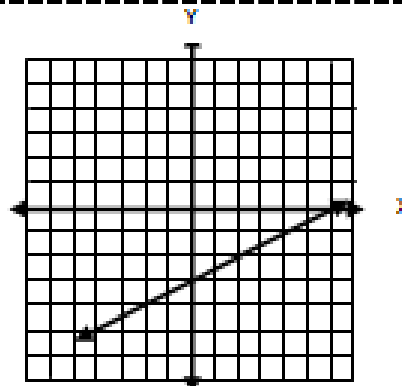
$$b = -4$$



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

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

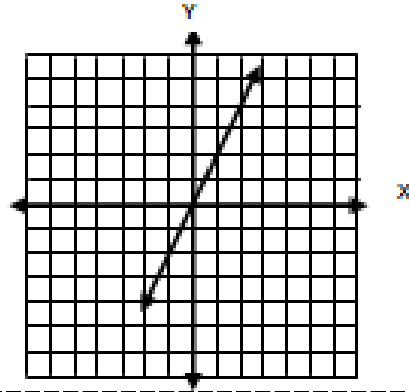
$$b = -3$$



$$y = 2x$$

$$m = 2$$

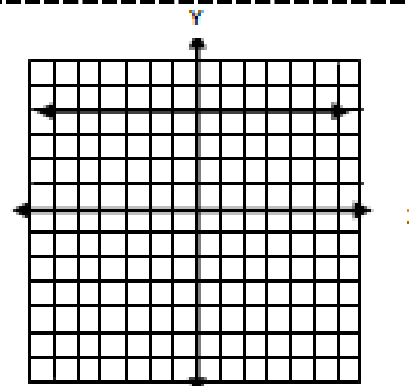
$$b = 0$$



$$y = 4$$

$$m = 0$$

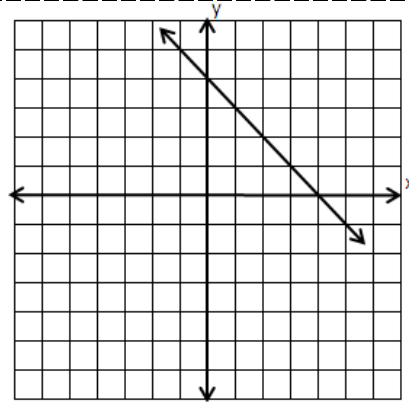
$$b = 4$$



$$y = -x + 4$$

$$m = -1$$

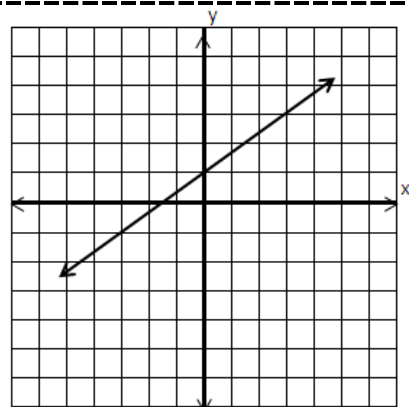
$$b = 4$$



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

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

$$b = 1$$



### Silent Bingo Game Card

<b>B</b>	<b>I</b>	<b>N</b>	<b>G</b>	<b>O</b>
<div style="text-align: center;"> <input type="checkbox"/>  <math>y = 2x + 1</math> </div>	<div style="text-align: center;"> <input type="checkbox"/>  <math>y = \frac{1}{3}x + 3</math> </div>	<div style="text-align: center;"> <input type="checkbox"/>  <math>y = \frac{1}{2}x - 1</math> </div>	<div style="text-align: center;"> <input type="checkbox"/>  <math>x = 8</math> </div>	<div style="text-align: center;"> <input type="checkbox"/>  <math>y = 3x - 5</math> </div>
<div style="text-align: center;"> <input type="checkbox"/>  <math>y = \frac{1}{2}x + 4</math> </div>	<div style="text-align: center;"> <input type="checkbox"/>  <math>y = -\frac{1}{3}x</math> </div>	<div style="text-align: center;"> <input type="checkbox"/>  <math>y = -5x + 11</math> </div>	<div style="text-align: center;"> <input type="checkbox"/>  <math>y = -x - 2</math> </div>	<div style="text-align: center;"> <input type="checkbox"/>  <math>x = 2</math> </div>
<div style="text-align: center;"> <input type="checkbox"/>  <math>y = 3x + 2</math> </div>	<div style="text-align: center;"> <input type="checkbox"/>  <math>y = -2x + 9</math> </div>	<b>Free Space</b>	<div style="text-align: center;"> <input type="checkbox"/>  <math>y = 4</math> </div>	<div style="text-align: center;"> <input type="checkbox"/>  <math>y = -2x + 3</math> </div>
<div style="text-align: center;"> <input type="checkbox"/>  <math>y = \frac{1}{2}x + 6</math> </div>	<div style="text-align: center;"> <input type="checkbox"/>  <math>y = -\frac{1}{3}x + 1</math> </div>	<div style="text-align: center;"> <input type="checkbox"/>  <math>y = -2x + 1</math> </div>	<div style="text-align: center;"> <input type="checkbox"/>  <math>y = -\frac{3}{2}x + 3</math> </div>	<div style="text-align: center;"> <input type="checkbox"/>  <math>y = 6x - 8</math> </div>
<div style="text-align: center;"> <input type="checkbox"/>  <math>y = -3</math> </div>	<div style="text-align: center;"> <input type="checkbox"/>  <math>y = 2</math> </div>	<div style="text-align: center;"> <input type="checkbox"/>  <math>y = 4x + 2</math> </div>	<div style="text-align: center;"> <input type="checkbox"/>  <math>y = \frac{1}{2}x + 1</math> </div>	<div style="text-align: center;"> <input type="checkbox"/>  <math>y = 3x</math> </div>