

Slope and y-intercept

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
- 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?

1. 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.
2. 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.
3. 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.

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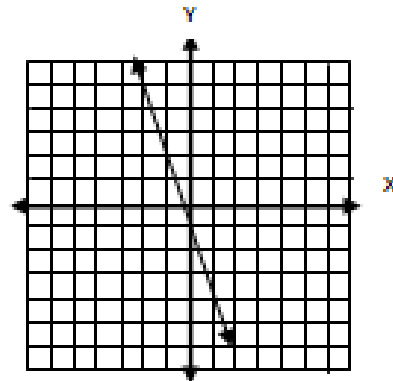
Slope-Intercept Cards

Copy on card stock and cut out.

$$y = -3x - 1$$

$$m = -3$$

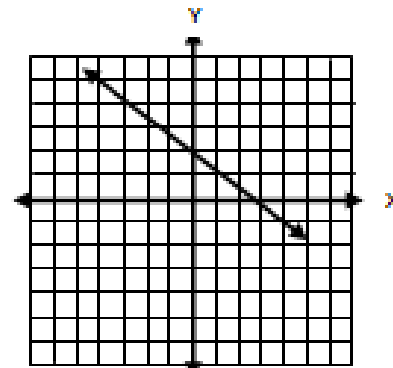
$$b = -1$$



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

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

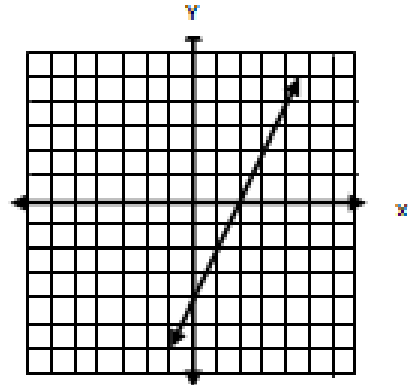
$$b = 2$$



$$y = 2x - 4$$

$$m = 2$$

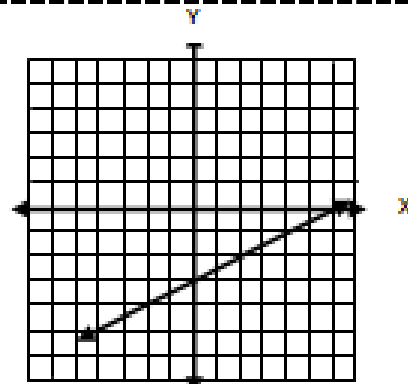
$$b = -4$$



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

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

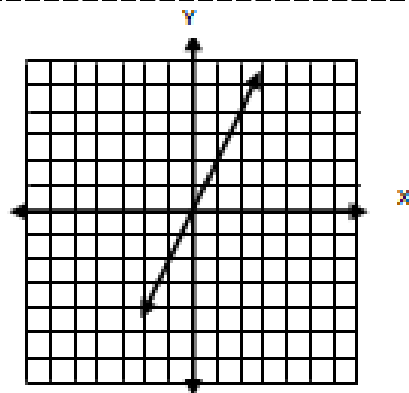
$$b = -3$$



$$y = 2x$$

$$m = 2$$

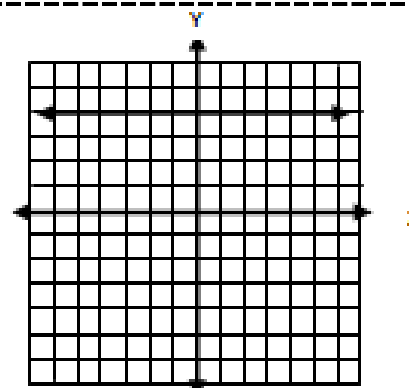
$$b = 0$$



$$y = 4$$

$$m = 0$$

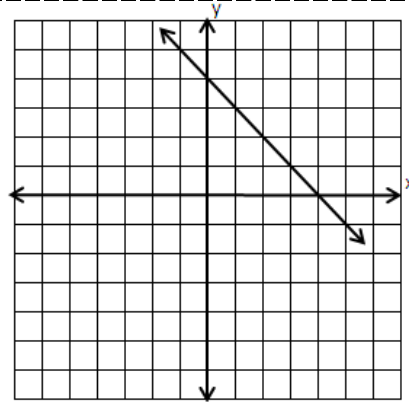
$$b = 4$$



$$y = -x + 4$$

$$m = -1$$

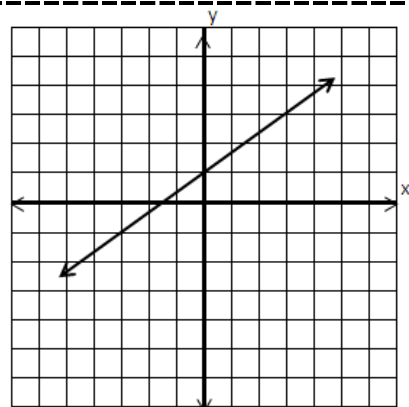
$$b = 4$$



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

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

$$b = 1$$



Silent Bingo Game Card

B	I	N	G	O
<div></div> $y = 2x + 1$	<div></div> $y = \frac{1}{3}x + 3$	<div></div> $y = \frac{1}{2}x - 1$	<div></div> $x = 8$	<div></div> $y = 3x - 5$
<div></div> $y = \frac{1}{2}x + 4$	<div></div> $y = -\frac{1}{3}x$	<div></div> $y = -5x + 11$	<div></div> $y = -x - 2$	<div></div> $x = 2$
<div></div> $y = 3x + 2$	<div></div> $y = -2x + 9$	Free Space	<div></div> $y = 4$	<div></div> $y = -2x + 3$
<div></div> $y = \frac{1}{2}x + 6$	<div></div> $y = -\frac{1}{3}x + 1$	<div></div> $y = -2x + 1$	<div></div> $y = -\frac{3}{2}x + 3$	<div></div> $y = 6x - 8$
<div></div> $y = -3$	<div></div> $y = 2$	<div></div> $y = 4x + 2$	<div></div> $y = \frac{1}{2}x + 1$	<div></div> $y = 3x$