Name_____ Date _____

3.5 Graphing Linear Equations in Slope-Intercept Form

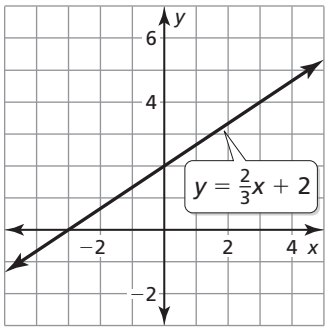
For use with Exploration 3.5

Essential Question How can you describe the graph of the equation $y = mx + b$?

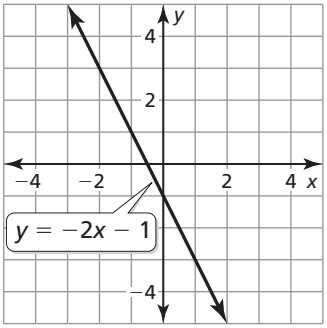
1 EXPLORATION: Finding Slopes and y-Intercepts

Work with a partner. Find the slope and y-intercept of each line.

a.



b.



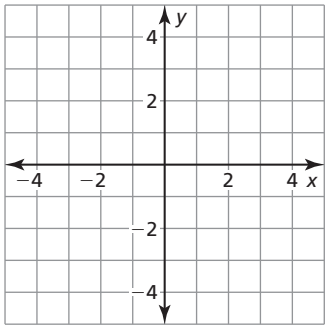
2 EXPLORATION: Writing a Conjecture

Go to *BigIdeasMath.com* for an interactive tool to investigate this exploration.

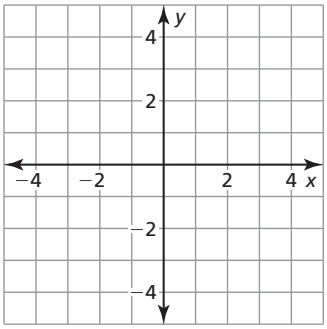
Work with a partner. Graph each equation. Then complete the table. Use the completed table to write a conjecture about the relationship between the graph of $y = mx + b$ and the values of m and b.

Equation	Description of graph	Slope of graph	y-Intercept
a. $y = -\frac{2}{3}x + 3$	Line	$-\frac{2}{3}$	3
b. $y = 2x - 2$			
c. $y = -x + 1$			
d. $y = x - 4$			

a.

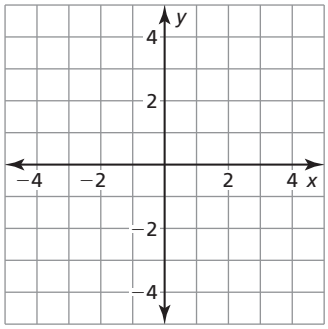


b.

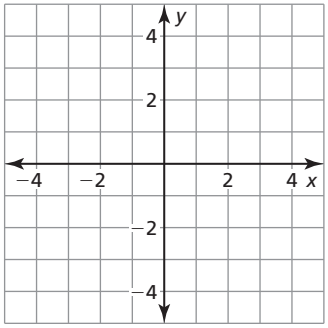


2 EXPLORATION: Writing a Conjecture (continued)

c.



d.



Communicate Your Answer

3. How can you describe the graph of the equation $y = mx + b$?

a. How does the value of m affect the graph of the equation?

b. How does the value of b affect the graph of the equation?

c. Check your answers to parts (a) and (b) by choosing one equation from Exploration 2 and (1) varying only m and (2) varying only b.

Name_____ Date _____

3.5 Notetaking with Vocabulary

For use after Lesson 3.5

In your own words, write the meaning of each vocabulary term.

slope

rise

run

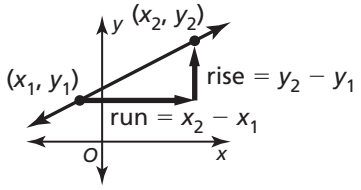
slope-intercept form

constant function

Core Concepts

Slope

The **slope** m of a nonvertical line passing through two points (x_1, y_1) and (x_2, y_2) is the ratio of the **rise** (change in y) to the **run** (change in x).



$$\text{slope} = m = \frac{\text{rise}}{\text{run}} = \frac{\text{change in } y}{\text{change in } x} = \frac{y_2 - y_1}{x_2 - x_1}$$

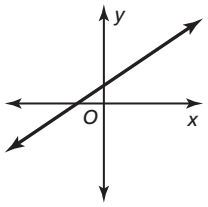
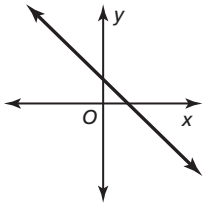
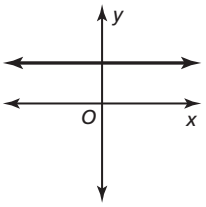
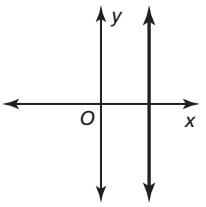
When the line rises from left to right, the slope is positive. When the line falls from left to right, the slope is negative.

Notes:

Name _____ Date _____

3.5 Notetaking with Vocabulary (continued)

Slope

Positive slope	*Negative slope*	*Slope of 0*	*Undefined slope*
			
The line rises from left to right.	The line falls from left to right.	The line is horizontal.	The line is vertical.

Notes:

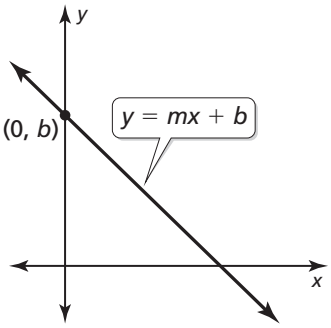
Slope-Intercept Form

Words A linear equation written in the form $y = mx + b$ is in **slope-intercept form**. The slope of the line is m, and the y-intercept of the line is b.

Algebra $y = mx + b$

slope: m

y-intercept: b



Notes:

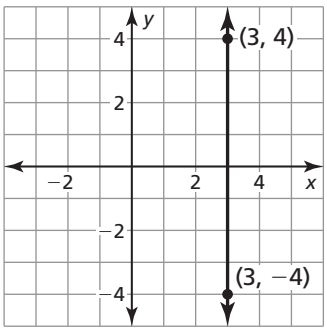
Name_____ Date _____

3.5 Notetaking with Vocabulary (continued)

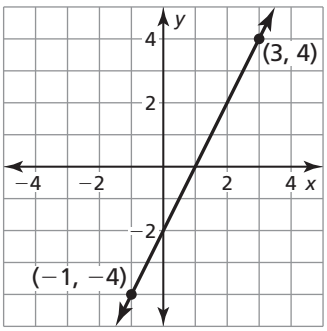
Extra Practice

In Exercise 1–3, describe the slope of the line. Then find the slope.

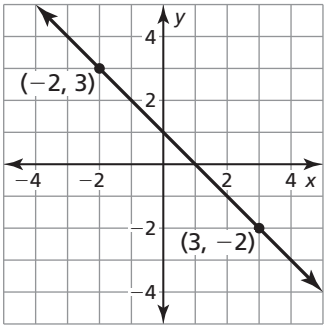
1.



2.



3.



In Exercise 4 and 5, the points represented by the table lie on a line. Find the slope of the line.

4.

x	1	2	3	4
y	–2	–2	–2	–2

5.

x	–3	–1	1	3
y	11	3	–5	–13

In Exercise 6–8, find the slope and the *y*-intercept of the graph of the linear equation.

6. $6x + 4y = 24$

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

8. $y = 5x$

9. A linear function f models a relationship in which the dependent variable decreases 6 units for every 3 units the independent variable decreases. The value of the function at 0 is 4. Graph the function. Identify the slope, y-intercept, and x-intercept of the graph.