

# 4.2

## Writing Equations in Point-Slope Form

For use with Exploration 4.2

**Essential Question** How can you write an equation of a line when you are given the slope and a point on the line?

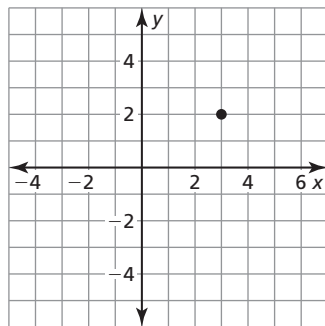
**1 EXPLORATION:** Writing Equations of Lines

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

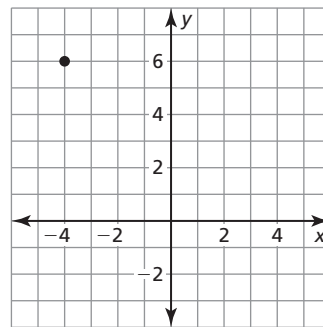
**Work with a partner.**

- Sketch the line that has the given slope and passes through the given point.
- Find the  $y$ -intercept of the line.
- Write an equation of the line.

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



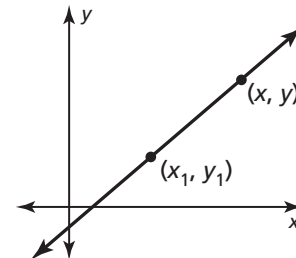
b.  $m = -2$



**2 EXPLORATION:** Writing a Formula

**Work with a partner.**

The point  $(x_1, y_1)$  is a given point on a nonvertical line. The point  $(x, y)$  is any other point on the line. Write an equation that represents the slope  $m$  of the line. Then rewrite this equation by multiplying each side by the difference of the  $x$ -coordinates to obtain the **point-slope form** of a linear equation.



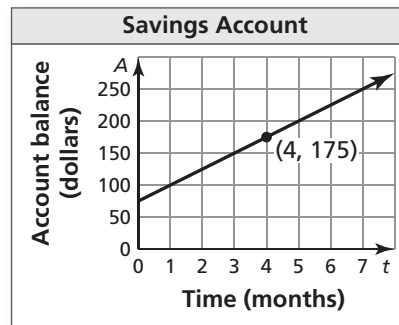
**4.2 Writing Equations in Point-Slope Form (continued)****3 EXPLORATION:** Writing an Equation

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

Work with a partner.

For four months, you have saved \$25 per month.  
You now have \$175 in your savings account.

- a. Use your result from Exploration 2 to write an equation that represents the balance  $A$  after  $t$  months.



- b. Use a graphing calculator to verify your equation.

**Communicate Your Answer**

4. How can you write an equation of a line when you are given the slope and a point on the line?
5. Give an example of how to write an equation of a line when you are given the slope and a point on the line. Your example should be different from those above.

# 4.2

## Notetaking with Vocabulary

For use after Lesson 4.2

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

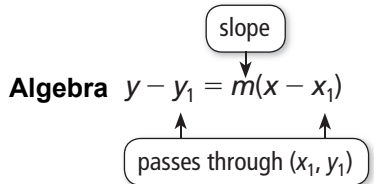
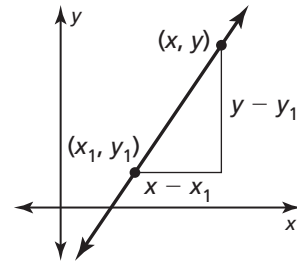
point-slope form

### Core Concepts

#### Point-Slope Form

**Words** A linear equation written in the form  $y - y_1 = m(x - x_1)$  is in **point-slope form**.

The line passes through the point  $(x_1, y_1)$ , and the slope of the line is  $m$ .



**Notes:**

**4.2** Notetaking with Vocabulary (continued)

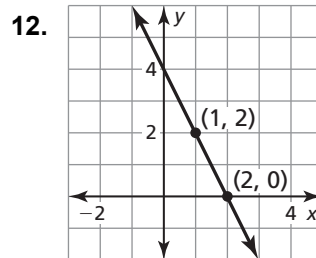
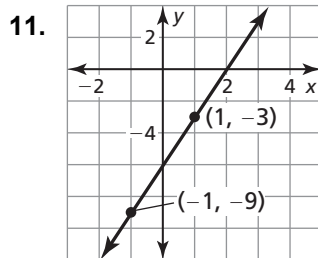
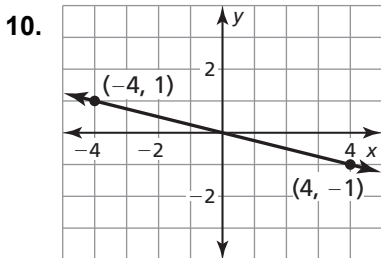
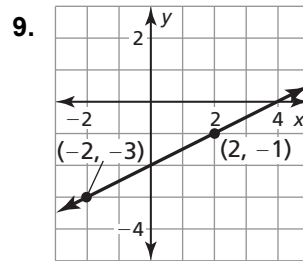
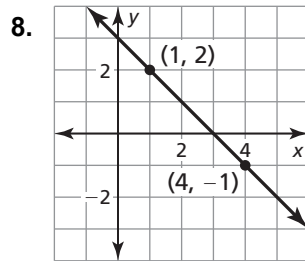
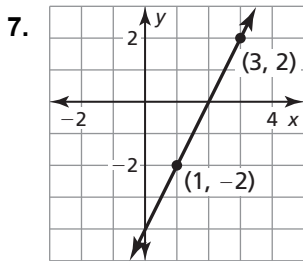
**Extra Practice**

In Exercises 1–6, write an equation in point-slope form of the line that passes through the given point and has the given slope.

1.  $(-2, 1); m = -3$                       2.  $(3, 5); m = 2$                       3.  $(-1, -2); m = -1$

4.  $(5, 0); m = \frac{4}{3}$                       5.  $(0, 4); m = 7$                       6.  $(1, 2); m = -\frac{1}{2}$

In Exercises 7–12, write an equation in slope-intercept form of the line shown.



**4.2** Notetaking with Vocabulary (continued)

In Exercises 13–18, write a linear function  $f$  with the given values.

13.  $f(-3) = -1, f(-2) = 4$     14.  $f(-2) = 1, f(1) = 7$     15.  $f(-1) = 2, f(3) = 3$

16.  $f(0) = -2, f(4) = -1$     17.  $f(1) = 0, f(0) = 8$     18.  $f(3) = 5, f(2) = 6$

In Exercises 19 and 20, tell whether the data in the table can be modeled by a linear equation. Explain. If possible, write a linear equation that represents  $y$  as a function of  $x$ .

19. 

$x$	-3	-1	0	1	3
$y$	-110	-60	-35	-10	40

20. 

$x$	-3	-1	0	1	3
$y$	-98	18	8	62	142

21. Craig is driving at a constant speed of 60 miles per hour. After driving 3 hours, his odometer reads 265 miles. Write a linear function  $D$  that represents the miles driven after  $h$  hours. What does the odometer read after 7 hours of continuous driving?