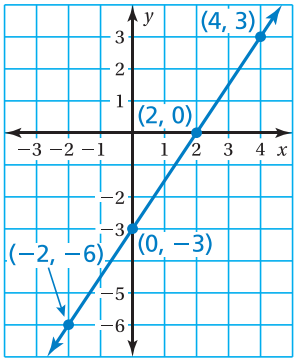
7.3 Lesson

Key Vocabulary
linear function, *p. 290*

A **linear function** is a function whose graph is a nonvertical line. A linear function can be written in the form $y = mx + b$, where m is the slope and b is the y-intercept.

EXAMPLE 1 Writing a Linear Function Using a Graph



Use the graph to write a linear function that relates y to x.

Find the slope of the line using the points (2, 0) and (4, 3).

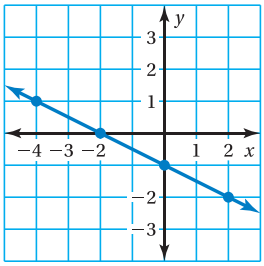
$$m = \frac{\text{change in } y}{\text{change in } x} = \frac{3 - 0}{4 - 2} = \frac{3}{2}$$

Because the line crosses the y-axis at $(0, -3)$, the y-intercept is -3.

So, the linear function is $y = \frac{3}{2}x - 3$.

Try It

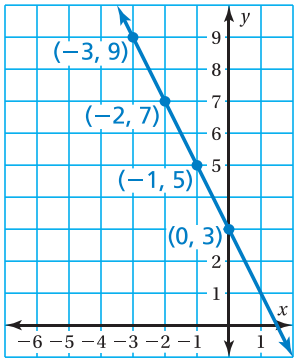
1. Use the graph to write a linear function that relates y to x.



EXAMPLE 2 Writing a Linear Function Using a Table

Use the table to write a linear function that relates y to x.

x	−3	−2	−1	0
y	9	7	5	3



Plot the points in the table. Draw a line through the points.

Find the slope of the line using the points $(-2, 7)$ and $(-3, 9)$.

$$m = \frac{\text{change in } y}{\text{change in } x} = \frac{9 - 7}{-3 - (-2)} = \frac{2}{-1} = -2$$

Because the line crosses the y-axis at $(0, 3)$, the y-intercept is 3.

So, the linear function is $y = -2x + 3$.

Try It

2. Use the table to write a linear function that relates y to x.

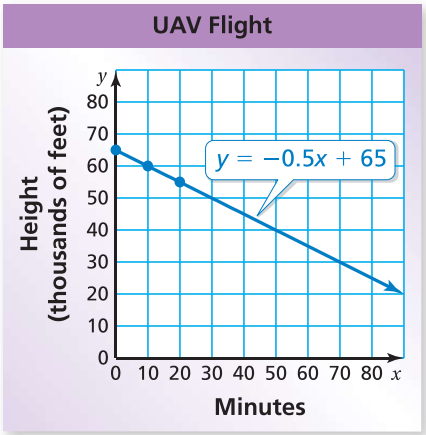
x	−2	−1	0	1
y	2	2	2	2

EXAMPLE 3 Interpreting a Linear Function

An unmanned aerial vehicle (UAV) is used for surveillance. The table shows the height y (in thousands of feet) of the UAV x minutes after it begins to descend from cruising altitude.

Minutes, x	Height (thousands of feet), y
0	65
10	60
20	55

a. Write and graph a linear function that relates y to x.



The table shows a constant rate of change, so you can write a linear function that relates the dependent variable y to the independent variable x.

The point $(0, 65)$ indicates that the y-intercept is 65. Use the points $(0, 65)$ and $(10, 60)$ to find the slope.

$$m = \frac{\text{change in } y}{\text{change in } x} = \frac{60 - 65}{10 - 0} = \frac{-5}{10} = -0.5$$

So, the linear function is $y = -0.5x + 65$. Plot the points in the table and draw a line through the points.

b. Interpret the slope and the y-intercept.

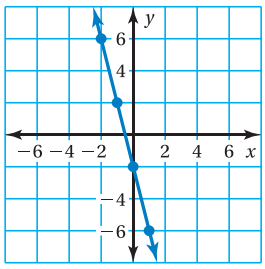
The slope indicates that the height decreases 500 feet per minute. The y-intercept indicates that the descent begins at a cruising altitude of 65,000 feet.

Try It

3. WHAT IF? The rate of descent doubles. Repeat parts (a) and (b).

Self-Assessment for Concepts & Skills

Solve each exercise. Then rate your understanding of the success criteria in your journal.



4. WRITING A LINEAR FUNCTION Use the graph to write a linear function that relates y to x.

5. INTERPRETING A LINEAR FUNCTION The table shows the revenue R (in millions of dollars) of a company when it spends A (in millions of dollars) on advertising.

Advertising, A	0	2	4	6	8
Revenue, R	2	6	10	14	18

a. Write and graph a linear function that relates R to A.

b. Interpret the slope and the y-intercept.