7.2 Lesson

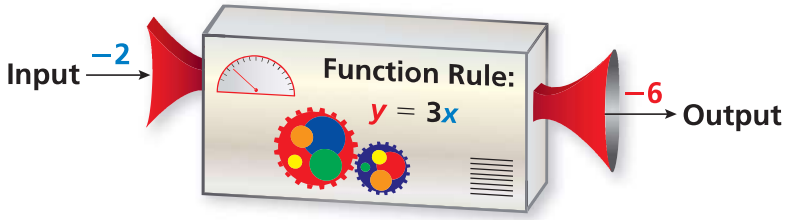
Key Vocabulary
function rule, *p. 282*

Remember
An independent variable represents a quantity that can change freely. A dependent variable depends on the independent variable.

Key Idea

Functions as Equations

A **function rule** is an equation that describes the relationship between inputs (independent variable) and outputs (dependent variable).



EXAMPLE 1 Writing Function Rules

a. Write a function rule for "The output is five less than the input."

Words The output is five less than the input.

Equation $y = x - 5$

A function rule is $y = x - 5$.

b. Write a function rule for "The output is the square of the input."

Words The output is the square of the input.

Equation $y = x^2$

A function rule is $y = x^2$.

Try It

1. Write a function rule for "The output is one-fourth of the input."

EXAMPLE 2 Evaluating a Function

What is the value of $y = 2x + 5$ when $x = 3$?

$y = 2x + 5$ Write the equation.

$= 2(3) + 5$ Substitute 3 for x.

$= 11$ Simplify.

Try It

Find the value of y when $x = 5$.

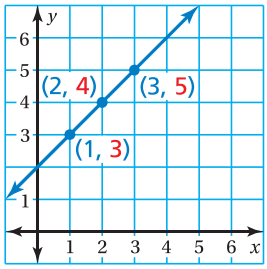
2. $y = 4x - 1$ **3.** $y = 10x$ **4.** $y = 7 - 3x$

Key Idea

Functions as Tables and Graphs

A function can be represented by an input-output table and by a graph. The table and graph below represent the function $y = x + 2$.

Input, x	Output, y	Ordered Pair, (x, y)
1	3	(1, 3)
2	4	(2, 4)
3	5	(3, 5)



By drawing a line through the points, you graph *all* of the solutions of the function $y = x + 2$.

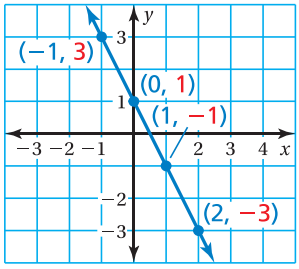
EXAMPLE 3 Graphing a Function

Graph the function $y = -2x + 1$.

Make an input-output table using inputs of -1, 0, 1, and 2.

Input, x	$-2x + 1$	Output, y	Ordered Pair, (x, y)
-1	$-2(-1) + 1$	3	$(-1, 3)$
0	$-2(0) + 1$	1	$(0, 1)$
1	$-2(1) + 1$	-1	$(1, -1)$
2	$-2(2) + 1$	-3	$(2, -3)$

Plot the ordered pairs and draw a line through the points.



Try It **Graph the function.**

5. $y = x + 1$ **6.** $y = -3x$ **7.** $y = 3x + 2$

Summary

Representations of Functions

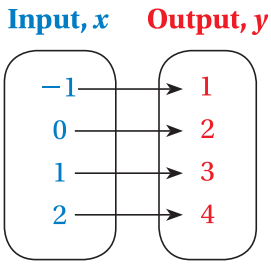
Words The output is 2 more than the input.

Equation $y = x + 2$

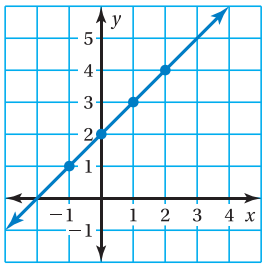
Input-Output Table

Input, x	Output, y
-1	1
0	2
1	3
2	4

Mapping Diagram



Graph



Self-Assessment for Concepts & Skills

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

WRITING FUNCTION RULES **Write a function rule for the statement.**

8. The output is three times the input.

9. The output is eight more than one-seventh of the input.

EVALUATING A FUNCTION **Find the value of y when $x = -5$.**

10. $y = 6x$ **11.** $y = 11 - x$ **12.** $y = \frac{1}{5}x + 1$

GRAPHING A FUNCTION **Graph the function.**

13. $y = -2x$ **14.** $y = x - 3$ **15.** $y = 9 - 3x$

16. **DIFFERENT WORDS, SAME QUESTION** Which is different? Find "both" answers.

What output is 4 more than twice the input 3?

What output is twice the sum of the input 3 and 4?

What output is the sum of 2 times the input 3 and 4?

What output is 4 increased by twice the input 3?