1.1 Parent Functions and Transformations

For use with Exploration 1.1

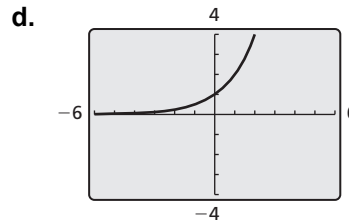**Essential Question** What are the characteristics of some of the basic parent functions?

1 EXPLORATION: Identifying Basic Parent Functions

Work with a partner. Graphs of eight basic parent functions are shown below. Classify each function as *constant, linear, absolute value, quadratic, square root, cubic, reciprocal,* or *exponential.* Justify your reasoning.
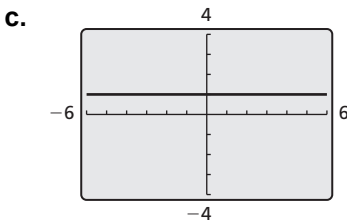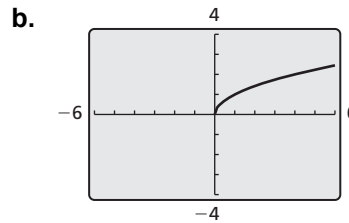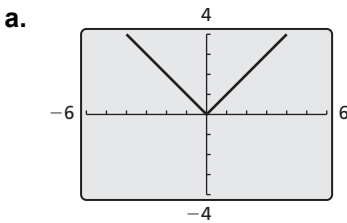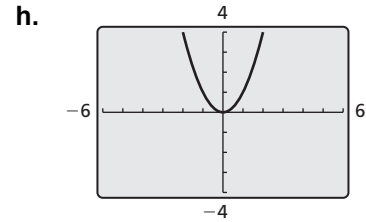
a.

b.

c.

d.

e.

f.
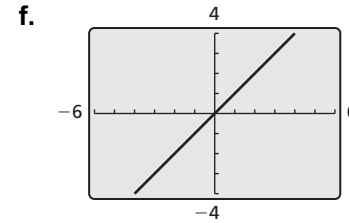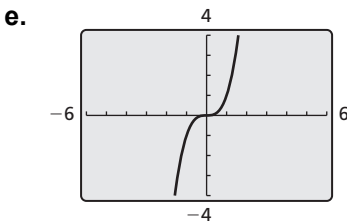
1.1 **Parent Functions and Transformations** (continued)

1 **EXPLORATION:** Identifying Basic Parent Functions (continued)

g.

h.
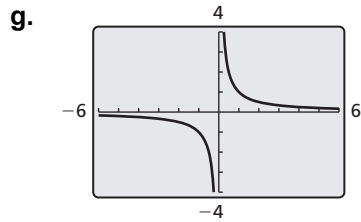
Communicate Your Answer

2. What are the characteristics of some of the basic parent functions?

3. Write an equation for each function whose graph is shown in Exploration 1.
Then use a graphing calculator to verify that your equations are correct.

Name _____ Date _____

Notetaking with Vocabulary
For use after Lesson 1.1

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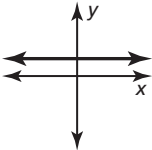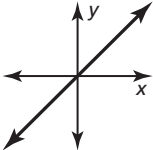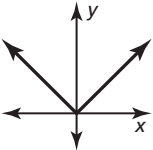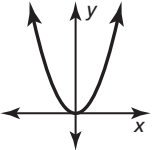
parent function

transformation

translation

reflection

vertical stretch

vertical shrink

Core Concepts

Parent Functions

Family	Constant	Linear	Absolute Value	Quadratic
Rule	$f(x) = 1$	$f(x) = x$	$f(x) = \lvert x \rvert$	$f(x) = x^2$
Graph				
Domain	All real numbers	All real numbers	All real numbers	All real numbers
Range	$y = 1$	All real numbers	$y \geq 0$	$y \geq 0$

Notes:

1.1   **Notetaking with Vocabulary** (continued)

Extra Practice

In Exercises 1–4, identify the function family to which *f* belongs. Compare the graph of *f* to the graph of its parent function.
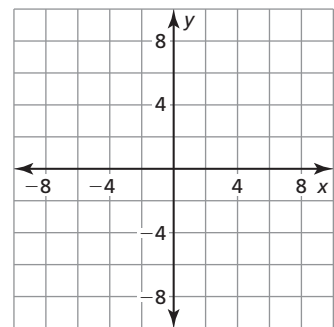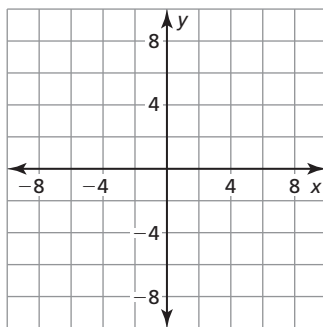
1.

$f(x) = -\frac{1}{4}x + 8$

2.

$f(x) = -3$

3.

$f(x) = |5x|$
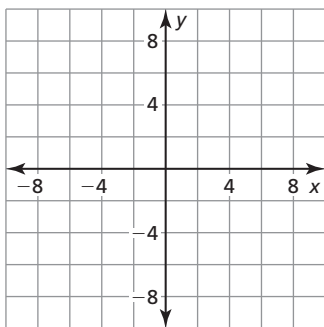
4.

$f(x) = (x - 1)^2 + 4$
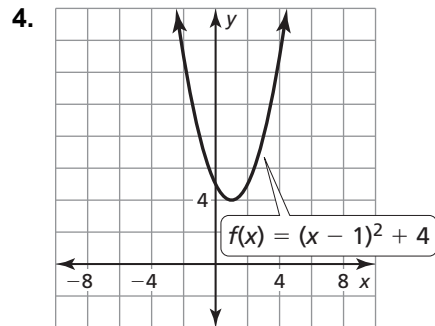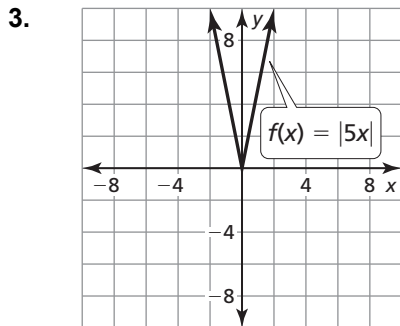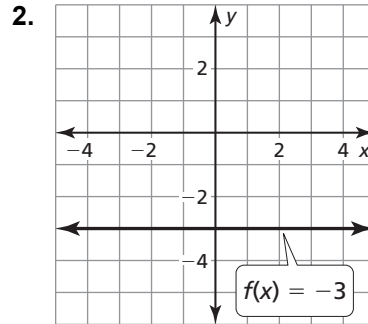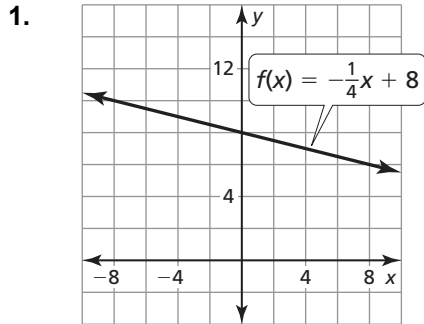
In Exercises 5–10, graph the function and its parent function. Then describe the transformation.

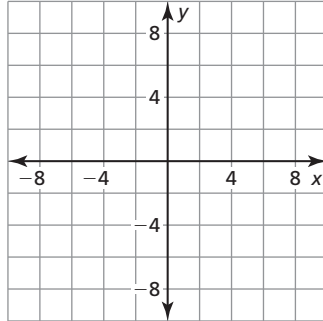**5.** $f(x) = x - 7$ **6.** $f(x) = -9$ **7.** $f(x) = |x| + 1$

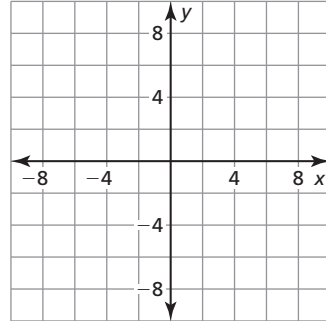**1.1** **Notetaking with Vocabulary (continued)**

8. $h(x) = -x^2$
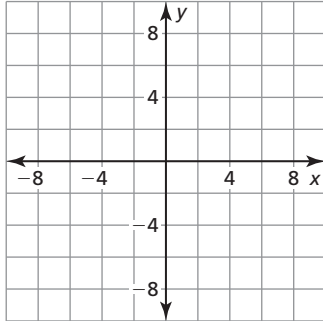
9. $f(x) = \frac{1}{8}x^2$

10. $g(x) = 6|x|$

11. Identify the function family of $f(x) = \frac{1}{3}|-x| + 4$ and describe the domain and range. Use a graphing calculator to verify your answer.

12. The table shows the distance a biker rides in his first team relay competition.

Time (hours), x	1	2	3	4
Distance (miles), y	12	24	36	48

   a. What type of function can you use to model the data? Explain.

   b. If the biker's teammate rides at the same pace but leaves 1 hour later, what type of transformation does this represent?