8.5 Using Intercept Form

For use with Exploration 8.5

Essential Question What are some of the characteristics of the graph of $f(x) = a(x - p)(x - q)$?

1 EXPLORATION: Using Zeros to Write Functions

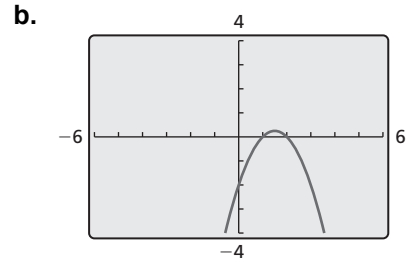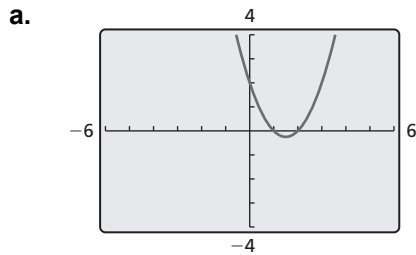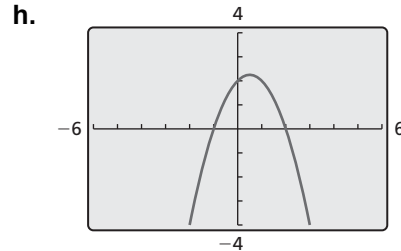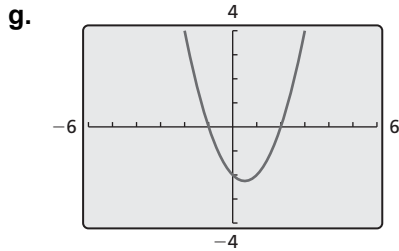**Work with a partner.** Each graph represents a function of the form $f(x) = (x - p)(x - q)$ or $f(x) = -(x - p)(x - q)$. Write the function represented by each graph. Explain your reasoning.

a.

b.

c.

d.

e.

f.
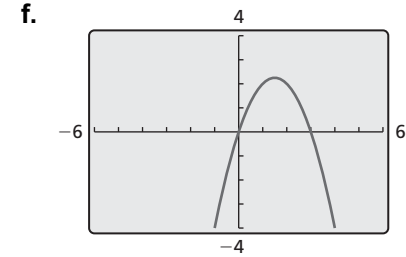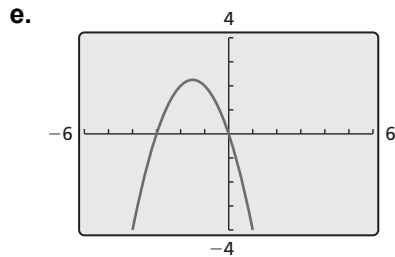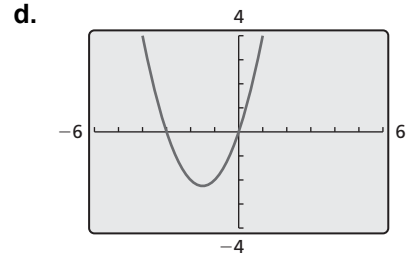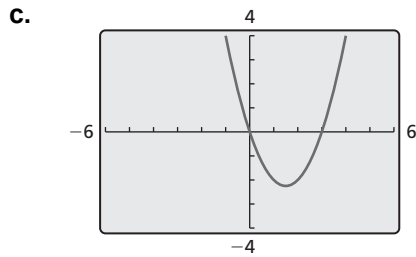
8.5 **Using Intercept Form** (continued)

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1 **EXPLORATION:** Using Zeros to Write Functions (continued)

g.

h.

Communicate Your Answer

2. What are some of the characteristics of the graph of $f(x) = a(x - p)(x - q)$?

3. Consider the graph of $f(x) = a(x - p)(x - q)$.

a. Does changing the sign of a change the x-intercepts? Does changing the sign of a change the y-intercept? Explain your reasoning.

b. Does changing the value of p change the x-intercepts? Does changing the value of p change the y-intercept? Explain your reasoning.
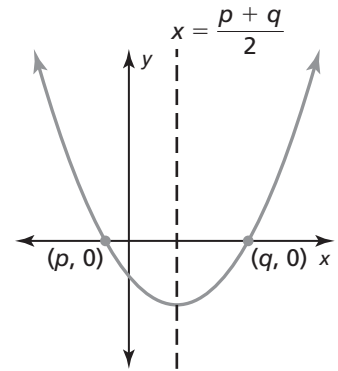
8.5 Notetaking with Vocabulary
For use after Lesson 8.5

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

intercept form

Core Concepts

Graphing $f(x) = a(x - p)(x - q)$

- The x-intercepts are p and q.

- The axis of symmetry is halfway between $(p, 0)$ and $(q, 0)$. So, the axis of symmetry is $x = \dfrac{p + q}{2}$.

- The graph opens up when $a > 0$, and the graph opens down when $a < 0$.

Notes:

Factors and Zeros

For any factor $x - n$ of a polynomial, n is a zero of the function defined by the polynomial.

Notes:

8.5 **Notetaking with Vocabulary** (continued)

Extra Practice

In Exercises 1 and 2, find the *x*-intercepts and axis of symmetry of the graph of the function.
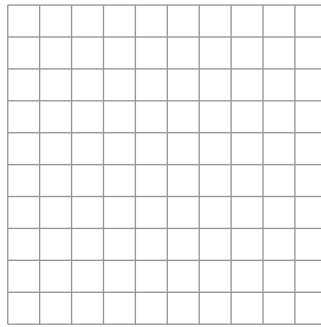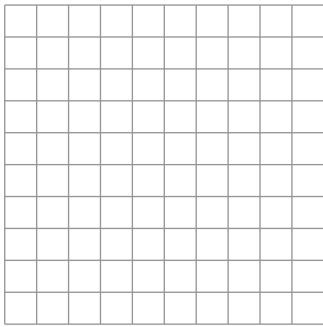
1. $y = (x + 2)(x - 4)$

2. $y = -3(x - 2)(x - 3)$

In Exercises 3–6, graph the quadratic function. Label the vertex, axis of symmetry, and *x*-intercepts. Describe the domain and range of the function.
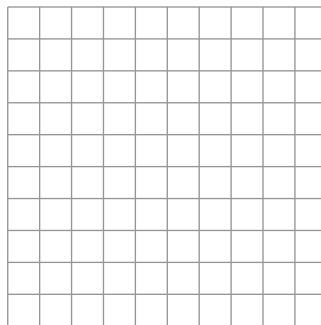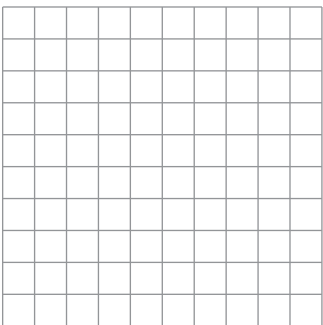
3. $m(x) = (x + 5)(x + 1)$

4. $y = -4(x - 3)(x - 1)$

5. $y = x^2 - 4$

6. $f(x) = x^2 + 2x - 15$
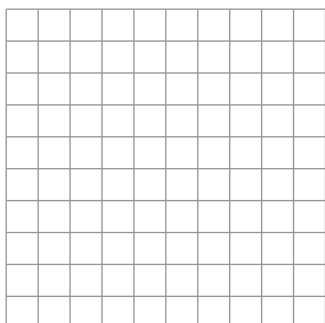
8.5 Notetaking with Vocabulary (continued)

In Exercises 7 and 8, find the zero(s) of the function.
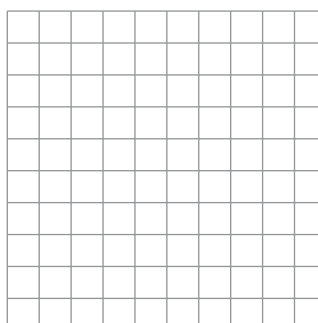
7. $y = 6x^2 - 6$

8. $y = x^2 + 9x + 20$

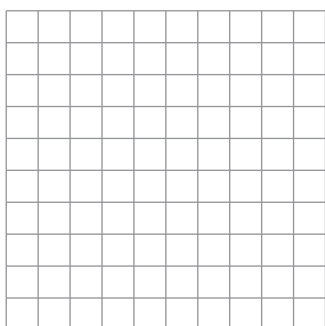**In Exercises 9–12, use zeros to graph the function.**

9. $f(x) = x^2 - 3x - 10$

10. $f(x) = -2(x + 3)(x - 1)$

11. $f(x) = x^3 - 9x$

12. $f(x) = 2x^3 - 12x^2 + 10x$