

## Chapter 2 Review

### 2.1 Quadratic Functions: Exploring Forms, pages 64–75

1. Consider the quadratic function  
 $f(x) = (x + 6)(x - 4)$ .
  - a) In which algebraic form is this function expressed? Does the parabola open upward or downward?
  - b) What are the  $x$ -intercepts?
  - c) Find the coordinates of the vertex. Is the vertex a maximum or a minimum? Explain.
  - d) What is the axis of symmetry?
  - e) What is the  $y$ -intercept?
  - f) Graph the function.
  - g) Identify the intervals for which the function is
    - i) positive or negative
    - ii) increasing or decreasing
2. Consider the quadratic function  
 $y = 3(x + 1)^2 + 2$ .
  - a) In which algebraic form is this function expressed? Does the parabola open upward or downward?
  - b) What are the coordinates of the vertex? Is the vertex a maximum or a minimum? Explain.
  - c) What is the axis of symmetry?
  - d) What is the  $y$ -intercept?
  - e) Graph the function.
  - f) Identify the intervals for which the function is increasing or decreasing.
3. Consider the quadratic function  
 $f(x) = x^2 - 6x + 10$ .
  - a) In which algebraic form is this function expressed?
  - b) Identify the values of  $a$ ,  $b$ , and  $c$ . Does this parabola open upward or downward?
  - c) What is the  $y$ -intercept?

- d) Create a table of values and graph the function. Use enough values to get a good idea of the shape of the graph.
  - e) Estimate the value of the
    - i)  $x$ -intercepts
    - ii) vertex
  - f) Is the vertex a maximum or a minimum? Explain.
4.
    - a) Write a quadratic function with the vertex at  $(2, 3)$  and  $x$ -intercepts of  $-1$  and  $5$ .
    - b) Sketch a graph of your function.

### 2.2 Quadratic Functions: Comparing Forms, pages 76–85

5. For each quadratic function
  - a)  $y = (x + 3)(x - 4)$
  - b)  $g(x) = (x - 1)^2 + 5$ 
    - i) express the function in standard form
    - ii) identify the values of  $a$ ,  $b$ , and  $c$
    - iii) identify the  $y$ -intercept
6. Expand and simplify each expression.
  - a)  $5(x - 3) - 2(3x + 1)$
  - b)  $3y(y + 2) + 2(4y - 6)$
  - c)  $(2a + 1)(a - 5) + (a - 6)(2a - 3)$
  - d)  $(3b - 2)^2 - (2b - 1)^2$
  - e)  $-5(p + 1)(p - 1) + (2p - 3)$
  - f)  $(q + 2)^2 - (q - 2)^2$
7.
  - a) Create a quadratic function expressed in factored form.
  - b) Write the function in standard form.
  - c) Identify the values of  $a$ ,  $b$ , and  $c$ .
  - d) Identify the  $y$ -intercept.
8.
  - a) Create a quadratic function expressed in vertex form.
  - b) Write the function in standard form.
  - c) Identify the values of  $a$ ,  $b$ , and  $c$ .
  - d) Identify the  $y$ -intercept.

**2.3 Factor Quadratic Expressions of the Form  $ax^2 + bx + c$ , pages 88–97**

9. Factor each expression. Use algebra tiles or diagrams to illustrate.
- $x^2 + 9x + 8$
  - $3x^2 + 10x + 3$
10. Factor, if possible. If not possible, write *not factorable*, and explain why.
- $y^2 + 7y - 18$
  - $k^2 - 5k - 14$
  - $3v^2 + 4v + 1$
  - $4n^2 - 4n - 3$
  - $2r^2 - 2r + 3$
  - $8x^2 - 10x - 3$
11. Fully factor each expression. Look for common factors first.
- $2x^2 - 6x - 20$
  - $3y^3 + 5y^2 - 2y$
12. Write each quadratic function in factored form. Then, identify the  $x$ -intercepts.
- $f(x) = x^2 + 9x - 10$
  - $y = 2x^2 - 7x + 3$
13. a) Create a rectangle using algebra tiles that represent  $x^2$ ,  $x$ , and 1.  
b) Write the corresponding polynomial in standard and factored form.

**2.4 Select and Apply Factoring Strategies, pages 98–107**

14. a) Identify the factors of  $x^2 + 8x + 16$ .  
b) Explain why this polynomial is called a perfect square trinomial, using words, diagrams, and/or algebraic reasoning.
15. Create a perfect square trinomial. Write the expression as an expanded polynomial and as a product of factors.

16. Factor each expression.

- $x^2 - 18x + 81$
- $4m^2 + 12m + 9$
- $n^2 - 25$
- $9v^2 - 100$

17. Fully factor each expression. Look for common factors first.

- $3w^2 - 108$
- $4g^2 + 60g + 176$
- $12n^2 + 8n - 20$
- $2k^3 - 8k^2 + 8k$

**2.5 Solve Quadratic Equations by Factoring, pages 108–113**

18. Find the roots of each equation.

- $x^2 - 14x + 24 = 0$
- $2p^2 + p - 3 = 0$
- $3q^2 + 16q + 5 = 0$
- $4m^2 - 1 = 0$
- $5r^2 - 11r + 2 = 0$
- $4n^2 - 2n - 2 = 0$

19. The sum of two whole numbers is 23 and the sum of their squares is 277. What are the numbers?
20. A square is surrounded by a sidewalk that is 1-m wide. The area of the square is  $1 \text{ m}^2$  greater than twice the area of the sidewalk. What are the dimensions of the square?
21. The arms of a right triangle have lengths that differ by 7 cm. The area is  $30 \text{ cm}^2$ . What is the length of the hypotenuse?
22. The lengths of the parallel sides of a trapezoid differ by 10 cm. The height of the trapezoid is the same length as the short parallel side. The area of the trapezoid is  $84 \text{ cm}^2$ . What are the lengths of the parallel sides of the trapezoid?