

## PREVIEW

## What's the chapter about?

Chapter 9 is about **rational expressions, functions, and equations**. In Chapter 9 you'll learn

- how to simplify and perform operations with rational expressions.
- how to graph rational functions and solve rational equations.
- how to use variation models and rational models in real-life situations.

## KEY VOCABULARY

### ► Review

- rational numbers, p. 3
- x-intercept, p. 84
- direct variation, p. 94
- zero of a function, p. 259

- degree of a polynomial function, p. 329
- asymptote, p. 465

### ► New

- inverse variation, p. 534
- joint variation, p. 536

- rational function, p. 540
- hyperbola, p. 540
- simplified form of a rational expression, p. 554
- complex fraction, p. 564

## PREPARE

## Are you ready for the chapter?

**SKILL REVIEW** Do these exercises to review key skills that you'll apply in this chapter. See the given **reference page** if there is something you don't understand.

**The variables  $x$  and  $y$  vary directly. Write an equation that relates the variables.** (Review Example 6, p. 94)

1.  $x = 2, y = 5$
2.  $x = 1, y = 0.1$
3.  $x = 8, y = -2$
4.  $x = -3, y = 12$

**Multiply the polynomials.** (Review Example 5, p. 13; Example 4, p. 339)

5.  $5(3x - 1)$
6.  $(x - 1)(x + 4)^2$
7.  $-x(x^2 - 5)$
8.  $x(x - 1)(x + 8)$

**Factor the polynomial.** (Review Examples 1–4, pp. 256 and 257; Examples 1–3, p. 346)

9.  $x^2 - 6x + 9$
10.  $4x^3 - 4$
11.  $8x^3 - 162x$
12.  $6x^2 + 7x - 5$

**Find all the real zeros of the function.** (Review Example 7, p. 259; Example 4, p. 354; Example 1, p. 359)

13.  $y = x^2 + 2x$
14.  $y = x^2 + 2x - 15$
15.  $y = x^3 - 2x^2 - 7x - 4$

## STUDENT HELP

### ► Study Tip

"Student Help" boxes throughout the chapter give you study tips and tell you where to look for extra help in this book and on the Internet.

## STUDY STRATEGY

## Here's a study strategy!

### Dictionary of Functions

Make a dictionary of all the types of functions you have learned in this course. For each entry, include the general form of the function and an example of the function and its graph. Continue to add entries as you work through this chapter. Use your dictionary as a study and reference tool.