

Evaluate the expression without using a calculator.

1.  $-125^{1/3}$  **-5**      2.  $32^{1/5}$  **2**      3.  $\sqrt[4]{81}$  **3**      4.  $\sqrt[3]{27}$  **3**  
 5.  $8^{5/3}$  **32**      6.  $16^{-3/2}$   **$\frac{1}{64}$**       7.  $(\sqrt[3]{-27})^2$  **9**      8.  $(\sqrt[3]{64})^{-4}$   **$\frac{1}{256}$**

Write the expression in simplest form. Assume all variables are positive.

9.  $\sqrt[3]{88}$   **$2\sqrt[3]{11}$**       10.  $\sqrt[5]{16} \cdot \sqrt[5]{8}$   **$2\sqrt[5]{4}$**       11.  $\sqrt{\frac{12}{49}}$   **$\frac{2\sqrt{3}}{7}$**       12.  $\frac{\sqrt[3]{24}}{\sqrt[3]{9}}$   **$\frac{2\sqrt[3]{9}}{3}$**   
 13.  $\sqrt[3]{64x^4y^2}$   **$4x\sqrt[3]{xy^2}$**       14.  $\sqrt[4]{2x^6y^8z}$   **$xy^2\sqrt[4]{2x^2z}$**       15.  $\sqrt[5]{\frac{x^6}{y^4}}$   **$\frac{x\sqrt[5]{xy}}{y}$**       16.  $\sqrt{\frac{75x^5y^6}{36xz^5}}$   **$\frac{5x^2y^3\sqrt{3z}}{6z^3}$**

Let  $f(x) = 2x + 9$  and  $g(x) = 3x - 1$ . Perform the indicated operation and state the domain.

17.  $f(x) + g(x)$       18.  $f(x) - g(x)$       19.  $f(x) \cdot g(x)$       20.  $\frac{f(x)}{g(x)}$   
 21.  $f(g(x))$   **$6x + 7$ , all real numbers**      22.  $g(f(x))$   **$6x + 26$ , all real numbers**      23.  $f(f(x))$   **$4x + 27$ , all real numbers**      24.  $g(g(x))$   **$9x - 4$ , all real numbers**

Find the inverse of the function.

25.  $y = -2x + 5$   **$y = \frac{5-x}{2}$**       26.  $y = \frac{1}{3}x + 4$   **$y = 3x - 12$**       27.  $f(x) = 5x - 12$   
 **$f^{-1}(x) = \frac{x+12}{5}$**   
 28.  $y = \frac{1}{2}x^4, x \geq 0$   **$y = \sqrt[4]{2x}$**       29.  $f(x) = x^3 + 5$   **$f^{-1}(x) = \sqrt[3]{x-5}$**       30.  $f(x) = -2x^3 + 1$   
 **$f^{-1}(x) = \sqrt[3]{\frac{1-x}{2}}$**

Graph the function. Then state the domain and range. **31–33. See margin for art.**

31.  $y = -6\sqrt[3]{x}$       32.  $y = \sqrt{x-4} - 2$       33.  $f(x) = -\sqrt[3]{x+3} + 4$

Solve the equation. Check for extraneous solutions.

34.  $\sqrt{3x+7} = 4$  **3**      35.  $\sqrt{3x} - \sqrt{x+6} = 0$  **3**      36.  $x - 3 = \sqrt{x-1}$  **5**

37. **KINETIC ENERGY** The kinetic energy  $E$  (in joules) of a 1250 kilogram compact car is given by the equation  $E = 625s^2$  where  $s$  is the speed of the car (in meters per second).  
 a. Write an inverse model that gives the speed of the car as a function of its kinetic energy.  **$s = \frac{\sqrt{E}}{25}$**   
 b. Use the inverse model to find the speed of the car if its kinetic energy is 120,000 joules. Give the speed in kilometers per hour. **about 49.9 km/h**  
 c. If the kinetic energy doubles, will the speed double? *Explain* why or why not. **No. Sample answer: Doubling the kinetic energy will increase the speed to about 70.5 kilometers per hour, which is not double the answer in part (b).**  
 38. **BOWLING SCORES** In bowling, a *handicap* is a change in score to adjust for differences in players' abilities. You belong to a bowling league in which each bowler's handicap  $h$  is determined by his or her average  $a$  using this formula:

$$h = 0.9(200 - a)$$

If a bowler's average is over 200, the handicap is 0. Find the inverse of the model. Then find your average if your handicap is 36.  **$a = -\frac{h}{0.9} + 200; 160$**

## Additional Resources

### Assessment Book

- Chapter Test, Levels A, B, C, pp. 79–84
- Standardized Chapter Test, pp. 85–86
- SAT/ACT Chapter Test, pp. 87–88
- Alternative Assessment, pp. 89–90

### Test Generator CD-ROM

#### Chapter Test

Easily-readable reduced copies (with answers) of Chapter Test B, the Standardized Chapter Test, and the Alternative Assessment from the Assessment Book can be found on pp. 412E–412F.

