6 CHAPTER TEST

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. $f(x) + g(x)$ **$5x + 8$; all real numbers**
18. $f(x) - g(x)$ **$-x + 10$; all real numbers**
19. $f(x) \cdot g(x)$ **$6x^2 + 25x - 9$; all real numbers**
20. $\frac{f(x)}{g(x)}$ **$\frac{2x+9}{3x-1}$; all real numbers except $x = \frac{1}{3}$**
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. $y = -6\sqrt[3]{x}$ **domain: all real numbers, range: all real numbers**
32. $y = \sqrt{x - 4} - 2$ **domain: $x \geq 4$, range: $y \geq -2$**
33. $f(x) = -\sqrt[3]{x + 3} + 4$ **domain: all real numbers, range: all real numbers**

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

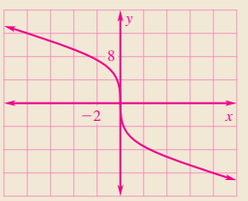
- Chapter Test, Levels A, B, C, pp. 79–84
- Standardized Chapter Test, pp. 85–86
- SAT/ACT Chapter Test, pp. 87–88
- Alternative Assessment, pp. 89–90

Test Generator CD-ROM

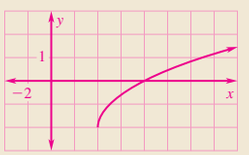
Chapter Test

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.

31.



32.



33.