CHAPTER TEST

Evaluate the expression without using a calculator.

1. $-125^{1/3}$

2. $32^{1/5}$

3. $\sqrt[4]{81}$

4. $\sqrt[3]{27}$

5. $8^{5/3}$

6. $16^{-3/2}$

7. $\left(\sqrt[3]{-27}\right)^2$

8. $\left(\sqrt[3]{64}\right)^{-4}$

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

9. $\sqrt[3]{88}$

10. $\sqrt[5]{16} \cdot \sqrt[5]{8}$

11. $\sqrt{\dfrac{12}{49}}$

12. $\dfrac{\sqrt[3]{24}}{\sqrt[3]{9}}$

13. $\sqrt[3]{64x^4y^2}$

14. $\sqrt[4]{2x^6y^8z}$

15. $\sqrt[5]{\dfrac{x^6}{y^4}}$

16. $\sqrt{\dfrac{75x^5y^6}{36xz^5}}$

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. $\dfrac{f(x)}{g(x)}$

21. $f(g(x))$

22. $g(f(x))$

23. $f(f(x))$

24. $g(g(x))$

Find the inverse of the function.

25. $y = -2x + 5$

26. $y = \dfrac{1}{3}x + 4$

27. $f(x) = 5x - 12$

28. $y = \dfrac{1}{2}x^4,\ x \ge 0$

29. $f(x) = x^3 + 5$

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

Graph the function. Then state the domain and range.

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. $\sqrt{3x + 7} = 4$

35. $\sqrt{3x} - \sqrt{x + 6} = 0$

36. $x - 3 = \sqrt{x - 1}$

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.

   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.

   c. If the kinetic energy doubles, will the speed double? *Explain* why or why not.

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.