Chapter 6

6.1 **Find the indicated real *n*th root(s) of *a*.**

1. $n = 4, a = 81$ **2.** $n = 3, a = 512$ **3.** $n = 5, a = -243$

6.1 **Evaluate the expression without using a calculator.**

4. $36^{-1/2}$ **5.** $64^{5/6}$ **6.** $\left(\sqrt[3]{216}\right)^{-2}$ **7.** $\left(\sqrt[5]{-32}\right)^{4}$

6.1 **Solve the equation. Round the result to two decimal places when appropriate.**

8. $x^3 = -8$ **9.** $x^4 + 9 = 90$ **10.** $(x - 3)^5 = 60$ **11.** $-4x^6 = -400$

6.2 **Simplify the expression.**

12. $4^{5/2} \cdot 4^{-1/2}$ **13.** $\dfrac{17^{3/7}}{17^{4/7}}$ **14.** $\left(\sqrt[4]{5} \cdot \sqrt{5}\right)^4$ **15.** $\dfrac{\sqrt[3]{135}}{\sqrt[3]{5}}$

16. $5\sqrt[5]{7} - 7\sqrt[5]{7}$ **17.** $\sqrt[3]{2} + 2\sqrt[3]{128}$ **18.** $\dfrac{324^{1/4}}{4^{-1/4}}$ **19.** $4\sqrt[3]{108} \cdot 2\sqrt[3]{4}$

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

20. $\sqrt{20x^6y^7}$ **21.** $\sqrt[5]{18x^3y^{14}z^{20}}$ **22.** $\sqrt[4]{\dfrac{x^5}{y^{16}}}$ **23.** $\sqrt[3]{16x^7y^2} \cdot \sqrt[3]{6xy^5}$

6.3 **Let $f(x) = -x + 4$, $g(x) = x^3$, and $h(x) = \dfrac{x}{4}$. Perform the indicated operation and state the domain.**

24. $f(x) + g(x)$ **25.** $g(x) - f(x)$ **26.** $g(x) \cdot h(x)$ **27.** $\dfrac{f(x)}{g(x)}$

28. $f(g(x))$ **29.** $g(h(x))$ **30.** $h(f(x))$ **31.** $f(f(x))$

6.4 **Verify that *f* and *g* are inverse functions.**

32. $f(x) = 2x - 4, g(x) = \dfrac{1}{2}x + 2$ **33.** $f(x) = 3x^2 + 1, x \geq 0; g(x) = \left(\dfrac{x - 1}{3}\right)^{1/2}$

6.4 **Find the inverse of the function.**

34. $f(x) = 5x - 3$ **35.** $f(x) = \dfrac{4}{3}x + 2$ **36.** $f(x) = \dfrac{1}{2}x^2, x \geq 0$

37. $f(x) = -x^6 + 2, x \leq 0$ **38.** $f(x) = \dfrac{4x^4 - 1}{18}, x \geq 0$ **39.** $f(x) = 32x^5 + 4$

6.5 **Graph the function. Then state the domain and range.**

40. $y = -\dfrac{1}{3}\sqrt{x}$ **41.** $y = \dfrac{2}{5}\sqrt[3]{x}$ **42.** $y = \dfrac{5}{6}\sqrt{x}$ **43.** $y = \sqrt{x + 2} - 3$

44. $y = -2\sqrt[3]{x - 1} + 2$ **45.** $f(x) = 3\sqrt[3]{x}$ **46.** $g(x) = -\dfrac{1}{2}\sqrt{x - 2}$ **47.** $h(x) = -\sqrt{x + 3} + 4$

6.6 **Solve the equation. Check your solution.**

48. $\sqrt{2x + 3} = 7$ **49.** $-5\sqrt{x + 1} + 12 = 2$ **50.** $\sqrt[3]{5x - 1} + 6 = 10$

51. $2\sqrt[3]{8x} + 9 = 5$ **52.** $7x^{4/3} = 175$ **53.** $(x - 2)^{3/4} = 1$

54. $x - 8 = \sqrt{18x}$ **55.** $x = \sqrt{4x - 3}$ **56.** $\sqrt{2x + 1} + 5 = \sqrt{x + 12} - 8$

EXTRA PRACTICE