EXERCISE SET 5.4

• Practice Exercises

Evaluate each expression in Exercises 1–10.

1. $\sqrt{9}$ 2. $\sqrt{16}$ 3. $\sqrt{25}$ 4. $\sqrt{49}$
5. $\sqrt{64}$ 6. $\sqrt{100}$ 7. $\sqrt{121}$ 8. $\sqrt{144}$
9. $\sqrt{169}$ 10. $\sqrt{225}$

In Exercises 11–16, use a calculator with a square root key to find a decimal approximation for each square root. Round the number displayed to the nearest **a.** *tenth,* **b.** *hundredth,* **c.** *thousandth.*

11. $\sqrt{173}$ 12. $\sqrt{3176}$ 13. $\sqrt{17{,}761}$
14. $\sqrt{779{,}264}$ 15. $\sqrt{\pi}$ 16. $\sqrt{2\pi}$

In Exercises 17–24, simplify the square root.

17. $\sqrt{20}$ 18. $\sqrt{50}$ 19. $\sqrt{80}$ 20. $\sqrt{12}$
21. $\sqrt{250}$ 22. $\sqrt{192}$ 23. $7\sqrt{28}$ 24. $3\sqrt{52}$

In Exercises 25–56, perform the indicated operation. Simplify the answer when possible.

25. $\sqrt{7}\cdot\sqrt{6}$ 26. $\sqrt{19}\cdot\sqrt{3}$ 27. $\sqrt{6}\cdot\sqrt{6}$
28. $\sqrt{5}\cdot\sqrt{5}$ 29. $\sqrt{3}\cdot\sqrt{6}$ 30. $\sqrt{12}\cdot\sqrt{2}$
31. $\sqrt{2}\cdot\sqrt{26}$ 32. $\sqrt{5}\cdot\sqrt{50}$ 33. $\dfrac{\sqrt{54}}{\sqrt{6}}$
34. $\dfrac{\sqrt{75}}{\sqrt{3}}$ 35. $\dfrac{\sqrt{90}}{\sqrt{2}}$ 36. $\dfrac{\sqrt{60}}{\sqrt{3}}$
37. $\dfrac{-\sqrt{96}}{\sqrt{2}}$ 38. $\dfrac{-\sqrt{150}}{\sqrt{3}}$ 39. $7\sqrt{3}+6\sqrt{3}$
40. $8\sqrt{5}+11\sqrt{5}$ 41. $4\sqrt{13}-6\sqrt{13}$
42. $6\sqrt{17}-8\sqrt{17}$ 43. $\sqrt{5}+\sqrt{5}$
44. $\sqrt{3}+\sqrt{3}$ 45. $4\sqrt{2}-5\sqrt{2}+8\sqrt{2}$
46. $6\sqrt{3}+8\sqrt{3}-16\sqrt{3}$ 47. $\sqrt{5}+\sqrt{20}$
48. $\sqrt{3}+\sqrt{27}$ 49. $\sqrt{50}-\sqrt{18}$
50. $\sqrt{63}-\sqrt{28}$ 51. $3\sqrt{18}+5\sqrt{50}$
52. $4\sqrt{12}+2\sqrt{75}$ 53. $\frac{1}{4}\sqrt{12}-\frac{1}{2}\sqrt{48}$
54. $\frac{1}{5}\sqrt{300}-\frac{2}{3}\sqrt{27}$ 55. $3\sqrt{75}+2\sqrt{12}-2\sqrt{48}$
56. $2\sqrt{72}+3\sqrt{50}-\sqrt{128}$

In Exercises 57–66, rationalize the denominator.

57. $\dfrac{5}{\sqrt{3}}$ 58. $\dfrac{12}{\sqrt{5}}$ 59. $\dfrac{21}{\sqrt{7}}$
60. $\dfrac{30}{\sqrt{5}}$ 61. $\dfrac{12}{\sqrt{30}}$ 62. $\dfrac{15}{\sqrt{50}}$
63. $\dfrac{15}{\sqrt{12}}$ 64. $\dfrac{13}{\sqrt{40}}$ 65. $\sqrt{\dfrac{2}{5}}$ 66. $\sqrt{\dfrac{5}{7}}$

• Practice Plus

In Exercises 67–74, perform the indicated operations. Simplify the answer when possible.

67. $3\sqrt{8}-\sqrt{32}+3\sqrt{72}-\sqrt{75}$
68. $3\sqrt{54}-2\sqrt{24}-\sqrt{96}+4\sqrt{63}$
69. $3\sqrt{7}-5\sqrt{14}\cdot\sqrt{2}$
70. $4\sqrt{2}-8\sqrt{10}\cdot\sqrt{5}$
71. $\dfrac{\sqrt{32}}{5}+\dfrac{\sqrt{18}}{7}$ 72. $\dfrac{\sqrt{27}}{2}+\dfrac{\sqrt{75}}{7}$
73. $\dfrac{\sqrt{2}}{\sqrt{3}}+\dfrac{\sqrt{3}}{\sqrt{2}}$ 74. $\dfrac{\sqrt{2}}{\sqrt{7}}+\dfrac{\sqrt{7}}{\sqrt{2}}$

• Application Exercises

The formula

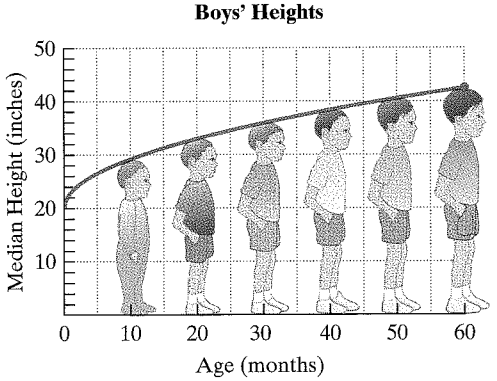
$$d=\sqrt{\frac{3h}{2}}$$

models the distance, d, in miles, that a person h feet high can see to the horizon. Use this formula to solve Exercises 75–76.

75. The pool deck on a cruise ship is 72 feet above the water. How far can passengers on the pool deck see? Write the answer in simplified radical form. Then use the simplified radical form and a calculator to express the answer to the nearest tenth of a mile.
76. The captain of a cruise ship is on the star deck, which is 120 feet above the water. How far can the captain see? Write the answer in simplified radical form. Then use the simplified radical form and a calculator to express the answer to the nearest tenth of a mile.

Police use the formula $v=2\sqrt{5L}$ to estimate the speed of a car, v, in miles per hour, based on the length, L, in feet, of its skid marks upon sudden braking on a dry asphalt road. Use the formula to solve Exercises 77–78.

77. A motorist is involved in an accident. A police officer measures the car's skid marks to be 245 feet long. Estimate the speed at which the motorist was traveling before braking. If the posted speed limit is 50 miles per hour and the motorist tells the officer he was not speeding, should the officer believe him? Explain.
78. A motorist is involved in an accident. A police officer measures the car's skid marks to be 45 feet long. Estimate the speed at which the motorist was traveling before braking. If the posted speed limit is 35 miles per hour and the motorist tells the officer she was not speeding, should the officer believe her? Explain.
79. The graph shows the median heights for boys of various ages in the United States from birth through 60 months, or five years old.



Source: Laura Walther Nathanson, *The Portable Pediatrician for Parents*