

EXERCISES

For more practice, see *Extra Practice*.

Practice and Problem Solving

A Practice by Example

Examples 1, 2
(pages 578, 579)

Simplify each radical expression.

- | | | | |
|------------------------------------|-------------------------------------|-------------------------------------|------------------------------------|
| 1. $\sqrt{200}$ | 2. $\sqrt{98}$ | 3. $\sqrt{75}$ | 4. $-\sqrt{80}$ |
| 5. $-3\sqrt{120}$ | 6. $5\sqrt{320}$ | 7. $\sqrt{28n^2}$ | 8. $\sqrt{108b^4}$ |
| 9. $3\sqrt{12x^2}$ | 10. $\sqrt{4n^3}$ | 11. $\sqrt{20a^5}$ | 12. $-\sqrt{48b^4}$ |
| 13. $\sqrt{10} \cdot \sqrt{40}$ | 14. $3\sqrt{6} \cdot \sqrt{6}$ | 15. $\sqrt{22} \cdot \sqrt{11}$ | 16. $2\sqrt{18} \cdot 7\sqrt{6}$ |
| 17. $\sqrt{7} \cdot \sqrt{21}$ | 18. $-3\sqrt{20} \cdot \sqrt{15}$ | 19. $\sqrt{3n} \cdot \sqrt{24n}$ | 20. $2\sqrt{7t} \cdot \sqrt{14t}$ |
| 21. $\sqrt{3x} \cdot \sqrt{51x^3}$ | 22. $5\sqrt{8t} \cdot \sqrt{32t^5}$ | 23. $\sqrt{2a^2} \cdot \sqrt{9a^4}$ | 24. $2\sqrt{6a^3} \cdot \sqrt{3a}$ |

Example 3
(page 579)

Example 4
(page 579)

For Exercises 25–27, use the formula $d = \sqrt{1.5h}$ to approximate distance d in miles to a horizon when h is the height in feet of the viewer's eyes above the ground. Round your answer to the nearest mile.

25. Find the distance you can see to the horizon from a height of 6 feet.
26. Find the distance you can see to the horizon from a height of 100 feet.
27. Find the distance you can see to the horizon from a height of 200 feet.

Example 5
(page 580)

Simplify each radical expression.

- | | | | |
|--------------------------------|-------------------------------|--------------------------------|-------------------------------|
| 28. $\sqrt{\frac{21}{49}}$ | 29. $3\sqrt{\frac{3}{4}}$ | 30. $\sqrt{\frac{625}{100}}$ | 31. $\sqrt{\frac{120}{121}}$ |
| 32. $\sqrt{\frac{5}{9a^2}}$ | 33. $\sqrt{\frac{7}{16c^2}}$ | 34. $\sqrt{\frac{75a}{49}}$ | 35. $\sqrt{\frac{8n^3}{81}}$ |
| 36. $\sqrt{\frac{15}{5}}$ | 37. $\sqrt{\frac{54}{24}}$ | 38. $\sqrt{\frac{60}{5}}$ | 39. $-\sqrt{\frac{160}{8}}$ |
| 40. $\sqrt{\frac{140x^3}{5x}}$ | 41. $\sqrt{\frac{3s^3}{27s}}$ | 42. $\sqrt{\frac{30a^5}{40a}}$ | 43. $\sqrt{\frac{63y}{7y^3}}$ |

Example 6
(page 580)

Example 7
(page 581)

Simplify each radical expression by rationalizing the denominator.

- | | | | |
|--------------------------|----------------------------|-----------------------------------|-------------------------------------|
| 44. $\frac{3}{\sqrt{2}}$ | 45. $\frac{5}{\sqrt{5}}$ | 46. $\frac{\sqrt{3}}{\sqrt{7x}}$ | 47. $\frac{2\sqrt{2}}{\sqrt{5n}}$ |
| 48. $\frac{9}{\sqrt{8}}$ | 49. $\frac{12}{\sqrt{12}}$ | 50. $\frac{3\sqrt{2}}{\sqrt{9b}}$ | 51. $\frac{5\sqrt{11}}{\sqrt{20y}}$ |

B Apply Your Skills

Writing Explain why each radical expression is or is not in simplest radical form.

- | | | | |
|---------------------------|--------------------------|-----------------|------------------|
| 52. $\frac{13}{\sqrt{4}}$ | 53. $\frac{3}{\sqrt{3}}$ | 54. $4\sqrt{3}$ | 55. $5\sqrt{30}$ |
|---------------------------|--------------------------|-----------------|------------------|

56. Suppose a and b are positive integers.

a. Verify that if $a = 18$ and $b = 10$, then $\sqrt{a} \cdot \sqrt{b} = 6\sqrt{5}$.

b. **Open-Ended** Find two other pairs of positive integers a and b such that $\sqrt{a} \cdot \sqrt{b} = 6\sqrt{5}$.

Simplify each radical expression.

- | | | | |
|-----------------------------------|-------------------------------------|-----------------------------------|--------------------------------|
| 57. $\sqrt{12} \cdot \sqrt{75}$ | 58. $\sqrt{26 \cdot 2}$ | 59. $\frac{\sqrt{72}}{\sqrt{64}}$ | 60. $\frac{-2}{\sqrt{a^3}}$ |
| 61. $\frac{\sqrt{180}}{\sqrt{3}}$ | 62. $\frac{\sqrt{x^2}}{\sqrt{y^3}}$ | 63. $\frac{-3\sqrt{2}}{\sqrt{6}}$ | 64. $\sqrt{8} \cdot \sqrt{10}$ |
| 65. $\sqrt{20a^2b^3}$ | 66. $\sqrt{a^3b^5c^3}$ | 67. $\sqrt{\frac{3m}{16m^2}}$ | 68. $\frac{16a}{\sqrt{6a^3}}$ |

Solve each equation. Leave your answer in simplest radical form.

69. $x^2 + 6x - 9 = 0$ 70. $n^2 - 2n + 1 = 5$ 71. $3y^2 - 4y - 2 = 0$

72. a. Show work to verify that $\sqrt{50}$ equals $5\sqrt{2}$.



b. **Writing** Explain why $5\sqrt{2}$ is in simplest radical form.

73. **Open-Ended** What are three numbers whose square roots can be written in the form $a\sqrt{3}$ for some value of a ?

74. **Newspaper Layout** A square picture on the front page of a newspaper occupies an area of 24 in.².

- a. Find the length of each side in simplest radical form.
b. Calculate the length of each side to the nearest hundredth of an inch.

C Challenge

Simplify each radical expression.

75. $\sqrt{24} \cdot \sqrt{2x} \cdot \sqrt{3x}$ 76. $2b(\sqrt{5b})^2$ 77. $\sqrt{45a^7} \cdot \sqrt{20a}$

78. **Physics** The time that a pendulum of a grandfather clock takes to swing back and forth one cycle is the period of the pendulum. The formula for finding the period T in seconds is $T = 2\pi\sqrt{\frac{L}{32}}$, where L is the length of the pendulum in feet. Find the period of a pendulum that is 8 feet long. Write your answer in terms of π .



Standardized Test Prep

Multiple Choice

79. Simplify $\sqrt{80}$.
A. $10\sqrt{8}$ B. $8\sqrt{10}$ C. $4\sqrt{5}$ D. 40
80. Simplify $5\sqrt{3x^2} \cdot \sqrt{6x}$.
F. $15x\sqrt{2x}$ G. $5x\sqrt{18x}$ H. $3x\sqrt{10x}$ I. $6x\sqrt{5x}$
81. Which of the following equals $\frac{2}{3}$?
A. $\sqrt{\frac{9}{25}}$ B. $\sqrt{\frac{20}{45}}$ C. $2\sqrt{\frac{4}{27}}$ D. $\sqrt{\frac{6}{9}}$
82. Which of the following equals $1.5\sqrt{0.038}$?
F. $150\sqrt{3.8}$ G. $15\sqrt{3.8}$ H. $15\sqrt{0.38}$ I. $15\sqrt{0.00038}$
83. A square window occupies an area of 96 ft². What is the length of each side of the window in simplest radical form? Show your work.



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Short Response

Mixed Review

Lesson 10-9

Which kind of function best models the data in each table? Write an equation to model the data.

84.

x	y
-1	0.2
0	0
1	0.2
2	0.8
3	1.8
4	3.2

85.

x	y
-1	1.6
0	4
1	10
2	25
3	62.5
4	156.25

86.

x	y
-1	11.2
0	7
1	2.8
2	-1.4
3	-5.6
4	-9.8

Lesson 10-2

Graph each function. Label the axis of symmetry and the vertex.

87. $f(x) = x^2 + 8x - 4$ 88. $y = x^2 - 10x + 7$ 89. $y = 3x^2 + 12x - 5$

Lesson 9-1

Simplify. Write each answer in standard form.

90. $(n^2 + 5n - 1) + (2n^2 + 6)$ 91. $(4v^2 + 8v - 2) - (v^2 + 9v + 7)$
92. $(5t^3 - 14t) + (8t^2 - 11)$ 93. $(2b^2 - 12b - 8) - (5b^2 + 11b + 13)$