

# 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.<sup>2</sup>.

- 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  $\pi$ .



**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 ft<sup>2</sup>. What is the length of each side of the window in simplest radical form? Show your work.



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Web Code: aea-1101

**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.  $(2b^2 - 12b - 8) - (5b^2 + 11b + 13)$