NAME

**Module 17** Simplifying Radical Expressions
**Lesson 1** Simplifying Radicals


**Simplify.**

1. $\sqrt{25}$ **5**
2. $\sqrt{49}$ **7**
3. $\sqrt{32}$ **$4\sqrt{2}$**
4. $\sqrt{18}$ **$3\sqrt{2}$**
5. $\sqrt{12}$ **$2\sqrt{3}$**
6. $\sqrt{20}$ **$2\sqrt{5}$**
7. $\sqrt{75}$ **$5\sqrt{3}$**
8. $\sqrt{50}$ **$5\sqrt{2}$**
9. $\sqrt{24}$ **$2\sqrt{6}$**
10. $\sqrt{72}$ **$6\sqrt{2}$**
11. $\sqrt{48}$ **$4\sqrt{3}$**
12. $\sqrt{125}$ **$5\sqrt{5}$**
13. $\sqrt{-20}$ **not a real number**
14. $-\sqrt[3]{135}$ **$-3\sqrt[3]{5}$**
15. $-\sqrt{300}$ **$-10\sqrt{3}$**
16. $-\sqrt{80}$ **$-4\sqrt{5}$**
17. $\sqrt[3]{56}$ **$2\sqrt[3]{7}$**
18. $\sqrt[3]{16}$ **$2\sqrt[3]{2}$**
19. $\sqrt[3]{-48}$ **$-2\sqrt[3]{6}$**
20. $\sqrt{-18}$ **not a real number**

## Journal

1. What does the square root symbol mean?
2. Why are there no real answers to square roots of negative numbers, but there are real answers to cube roots of negative numbers?
3. Why is it better to simplify radicals than to find a decimal approximation?
4. George simplified $\sqrt{720}$ and got $6\sqrt{20}$. Carrie simplified $\sqrt{720}$ and got $12\sqrt{5}$. Who is correct and why?
5. Explain how to simplify $\sqrt{75}$.

## Cumulative Review

**Solve. Simplify any radical answers.**

1. $x^2 = 24$ **$x = \pm 2\sqrt{6}$**
2. $x^2 = 245$ **$x = \pm 7\sqrt{5}$**
3. $x^2 + 5x + 6 = 0$ **$x = -3$ or $-2$**
4. $x^2 - 4x = 12$ **$x = -2$ or $6$**
5. $x^2 - 3x - 10 = 0$ **$x = -2$ or $5$**
6. $x^2 + 5x + 4 = 0$ **$x = -4$ or $-1$**

**7.** $x^2 - 4x - 7 = 0$ $x = 2 \pm \sqrt{11}$

**8.** $x^2 - 2x - 5 = 0$ $x = 1 \pm \sqrt{6}$

**9.** $-x^2 - 3x + 9 = 0$ $x = \frac{-3 \pm 3\sqrt{5}}{2}$

**10.** $\frac{x^2 + 2x + 1}{x - 1} = 8$ $x = 3$

**Possible Journal Answers**

1. The square of a number is the number times itself. The square root symbol means to find what number times itself equals the number on the inside of the square root symbol. Taking a square root is the opposite (or inverse operation) of squaring a number.
2. One cannot multiply a number by itself and get a negative number. Consider the possibilities: a positive multiplied by another positive is a positive. A negative multiplied by another negative is positive. For cube roots there are two possibilities: the root is a positive or a negative number. A positive times a positive is still positive. A negative times a negative is positive, but when multiplied by a negative again, the answer is negative. So, it is possible for a cube root to be a negative number.
3. A simplified radical is an exact answer. A decimal approximation is not exact. It is approximate. For measurements, a decimal is usually more appropriate, but for solving more complex math problems, a simplified radical can make computations easier.
4. Carrie is correct. Although George's answer is equal to $7\sqrt{20}$, it is not fully simplified. George's answer simplifies to $12\sqrt{5}$. ($6\sqrt{20} = 6\sqrt{4} \cdot \sqrt{5} = 6 \cdot 2\sqrt{5} = 12\sqrt{5}$)
5. Examine the factors of 75. They are 1, 3, 5, 15, 25, and 75. The perfect square, 25, is one of the factors of 75. So, $\sqrt{75} = \sqrt{25} \cdot \sqrt{3} = 5\sqrt{3}$.