

11.2 Simplify Radical Expressions

pp. 719–726

EXAMPLE

 Simplify $7\sqrt{5} - \sqrt{45}$.

$$\begin{aligned} 7\sqrt{5} - \sqrt{45} &= 7\sqrt{5} - \sqrt{9 \cdot 5} \\ &= 7\sqrt{5} - \sqrt{9} \cdot \sqrt{5} \\ &= 7\sqrt{5} - 3\sqrt{5} \\ &= (7 - 3)\sqrt{5} \\ &= 4\sqrt{5} \end{aligned}$$

Factor using perfect square factor.
Product property of radicals
Simplify.
Distributive property
Simplify.

EXERCISES

Simplify the expression.

8. $\sqrt{98}$

9. $\sqrt{121x^3}$

10. $\sqrt{7} \cdot \sqrt{21}$

11. $\sqrt{7x} \cdot 7\sqrt{x}$

12. $\sqrt{\frac{5}{x^2}}$

13. $\frac{2}{\sqrt{5}}$

14. $3\sqrt{2} - \sqrt{128}$

15. $\sqrt{2}(7 - \sqrt{6})$

16. **GEOMETRY** The lateral surface area L of a square pyramid with height h and base length ℓ is given by $L = 2\ell\sqrt{0.25\ell^2 + h^2}$. Find L (in square feet) for a square pyramid that has a height of 4 feet and a base length of 4 feet.

EXAMPLES 1–7

 on pp. 719–722
 for Exs. 8–16

11.3 Solve Radical Equations

pp. 729–734

EXAMPLE

 Solve $\sqrt{x + 90} = x$.

$$\begin{aligned} \sqrt{x + 90} &= x \\ (\sqrt{x + 90})^2 &= x^2 \\ x + 90 &= x^2 \end{aligned}$$

Write original equation.
Square each side.
Simplify.

$$0 = x^2 - x - 90$$

Write in standard form.

$$0 = (x - 10)(x + 9)$$

Factor.

$$x - 10 = 0 \quad \text{or} \quad x + 9 = 0$$

Zero-product property

$$x = 10 \quad \text{or} \quad x = -9$$

Solve for x .

- ▶ Checking 10 and -9 in the original equation shows that -9 is an extraneous solution. The only solution of the equation is 10.

EXERCISES

Solve the equation. Check for extraneous solutions.

17. $\sqrt{x} - 28 = 0$

18. $8\sqrt{x - 5} + 34 = 58$

19. $\sqrt{5x - 3} = \sqrt{x + 17}$

20. $\sqrt{5x} + 6 = 5$

21. $\sqrt{x} + 36 = 0$

22. $x = \sqrt{2 - x}$

EXAMPLES 1, 2, 3, and 4

 on pp. 729–731
 for Exs. 17–22