

# Solving Radical Equations (Pages 624–629)

Equations that contain radicals with variables in the radicand are called **radical equations**. To solve a radical equation, first isolate the radical on one side of the equation. Then square each side of the equation to eliminate the radical.

## EXAMPLES

**A** Solve  $\sqrt{x} - 4 = -2$ .

$$\sqrt{x} - 4 = -2$$

$$\sqrt{x} = 2$$

Add 4 to each side.

$$(\sqrt{x})^2 = 2^2$$

Square each side.

$$x = 4$$

Check the solution.

$$\sqrt{x} - 4 = -2$$

$$\sqrt{4} - 4 \stackrel{?}{=} -2$$

$$2 - 4 \stackrel{?}{=} -2$$

$$-2 = -2 \checkmark$$

**B** Solve  $\sqrt{2x - 4} = x - 2$ .

$$\sqrt{2x - 4} = x - 2$$

$$(\sqrt{2x - 4})^2 = (x - 2)^2$$

$$2x - 4 = x^2 - 4x + 4$$

$$0 = x^2 - 6x + 8$$

$$0 = (x - 4)(x - 2) \quad \text{Factor.}$$

$$x = 4 \text{ or } x = 2 \quad \text{Use the Zero Product Property.}$$

Check your solutions.

$$\sqrt{2x - 4} = x - 2$$

$$\sqrt{2x - 4} = x - 2$$

$$\sqrt{2(4) - 4} \stackrel{?}{=} 4 - 2$$

$$\sqrt{2(2) - 4} \stackrel{?}{=} 2 - 2$$

$$\sqrt{4} \stackrel{?}{=} 2$$

$$\sqrt{0} \stackrel{?}{=} 0$$

$$2 = 2 \checkmark$$

$$0 = 0 \checkmark$$

## Try These Together

Solve each equation. Check your solution.

1.  $\sqrt{x} = 4$

2.  $\sqrt{y} = 6$

3.  $\sqrt{a} - 2 = 7$

HINT: Isolate the radical and then square each side to eliminate the radical.

## PRACTICE

Solve each equation. Check your solution

4.  $\sqrt{y} - 4 = 0$

5.  $\sqrt{c} + 4 = 0$

6.  $\sqrt{s} + 2 = 0$

7.  $\sqrt{3t + 1} = 8$

8.  $\sqrt{2x - 2} = 4$

9.  $\sqrt{b - 6} + 8 = b$

10.  $3 + 2\sqrt{m} = 7$

11.  $\sqrt{2n + 7} + 4 = n$

12.  $\sqrt{a - 3} = a - 5$

13.  $\sqrt{x + 6} = x + 4$

14.  $3 + \sqrt{a - 3} = 6$

15.  $15 + \sqrt{y - 12} = 33$

- 16. Physics** The period  $T$  of a pendulum is the time it takes to make one complete swing. At the earth's surface,  $T = 2\pi\sqrt{\frac{L}{32}}$ , where  $T$  is measured in seconds and  $L$  is the length of the pendulum in feet. To the nearest tenth, how long is a pendulum with a period of 2 seconds?



**17. Standardized Test Practice** Solve the equation  $\sqrt{x + 7} = 2\sqrt{2}$ .

A 1

B 2

C 7

D 8

Answers: 1. 16 2. 36 3. 81 4. 16 5. no solution 6. no solution 7. 21 8. 9 9. 10 10. 4 11. 9 12. 7 13. -2 14. 12 15. 336 16. 3.2 ft 17. A