

13-4

NAME _____ DATE _____

Radical Equations (Pages 732–736)

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.

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

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

$$2 - 4 = -2$$

$$-2 = -2$$

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

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

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

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

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

$$0 = (x - 4)(x - 2)$$
 Factor.

$$x = 4 \text{ or } x = 2$$

*Use the zero product property.**Check your solutions.*

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

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

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

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

$$\sqrt{4} = 2$$

$$\sqrt{0} = 0$$

$$2 = 2$$

$$0 = 0$$

Try These Together**Solve each equation. Check your solution**

1. $\sqrt{x} = \sqrt{3}$

2. $\sqrt{y} = \sqrt{6}$

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

*HINT: Isolate the radical and then square both sides 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. $\sqrt{3t} + 1 = 6$

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

9. $16 - 5\sqrt{2y} = 1$

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

11. $5 + 3\sqrt{4x} = 8$

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. 3 2. 6 3. 45 4. 16 5. no solution 6. no solution 7. $11\frac{3}{2}$ 8. 9 9. $4\frac{2}{1}$ 10. 4 11. $\frac{4}{1}$ 12. 7 13. -2 14. 12 15. 336 16. 3.2 ft 17. A