

Lesson 10-4 Solving Radical Equations

Essential Understanding You can solve some radical equations by squaring each side of the equation and testing the solutions.

Problem 1 Solving by Isolating the Radical

What is the solution of $\sqrt{x} + 7 = 16$?

Got It? 1. What is the solution of $\sqrt{x} - 5 = -2$?

Why is it necessary to test the solution(s)? Let's see:

- (a) Start with this equation: $x = 3$
- (b) What is the solution?
- (c) Now square both sides:
- (d) What are the solutions now?

In the example above, -3 does not satisfy the original equation. It is an *extraneous* solution. An **extraneous solution** is an apparent solution that does not satisfy the original equation. Always substitute each apparent solution into the original equation to check for extraneous solutions.

Problem 3 Solving With Radical Expressions on Both Sides

What is the solution of $\sqrt{5t - 11} = \sqrt{t + 5}$?

Got It? 3. What is the solution of $\sqrt{7x - 4} = \sqrt{5x + 10}$?

Problem 4 Identifying Extraneous Solutions

What is the solution of $n = \sqrt{n + 12}$?

Got It? 4. What is the solution of $-y = \sqrt{y + 6}$?

Problem 5 Identifying Equations With No Solution

What is the solution of $\sqrt{3y} + 8 = 2$?

Got It? 5. a. What is the solution of $6 - \sqrt{2x} = 10$?

Solve each radical equation. Check your solution.

7. $\sqrt{x} + 3 = 5$

9. $\sqrt{z} - 1 = 5$

11. $\sqrt{2b} + 4 = 8$

13. $\sqrt{3a + 1} = 7$

15. $1 = \sqrt{-2v - 3}$

Solve each radical equation. Check your solution.

19. $\sqrt{3x + 1} = \sqrt{5x - 8}$

21. $\sqrt{7v - 4} = \sqrt{5v + 10}$

23. $\sqrt{n + 5} = \sqrt{5n - 11}$

Solve each radical equation. Check your solution. If there is no solution, write *no solution*.

31. $x = \sqrt{2x + 3}$

33. $\sqrt{3b} = -3$

35. $-2\sqrt{2r + 5} = 6$

