

# CHAPTER 11: RADICAL EXPRESSIONS

11.3 Solving Radical Expressions

## OBJECTIVES

- I can solve equations with radicals
- I can identify extraneous solutions

## PART 1: SOLVING RADICAL EQUATIONS

A **radical equation** is an equation that has a variable in a radicand. You can often solve a radical equation by getting the radical by itself on one side of the equation. Then you square both sides.

1 Solve each equation. Check your solution.

a.  $\sqrt{x} + 7 = 12$

b.  $\sqrt{a} - 4 = 5$

c.  $\sqrt{c - 2} = 6$

## PART 1: SOLVING RADICAL EQUATIONS

3 Solve  $\sqrt{3t + 4} = \sqrt{5t - 6}$ . Check your answer.

## PART 2: EXTRANEOUS SOLUTIONS

When you solve an equation by squaring each side, you create a new equation. This new equation may have solutions that do not solve the original equation.

Original equation	Square of each side	New equation	Solutions of new equation
$x = 2$	$\longrightarrow (x)^2 = (2)^2$	$\longrightarrow x^2 = 4$	$\longrightarrow 2, -2$

In the example above,  $-2$  does not satisfy the original equation. It is an extraneous solution. An **extraneous solution** is a solution that does not satisfy the original equation. Be sure to check all solutions in the original equation to determine whether a solution is extraneous.

## PART 2: EXTRANEOUS SOLUTIONS

Solve  $8 - \sqrt{2n} = 20$ . Check your solution.

## PART 2: EXTRANEOUS SOLUTIONS

Solve  $x = \sqrt{x + 6}$ .

## CAN YOU?? PROVE IT!!

- I can solve equations with radicals

$$\sqrt{x - 3} = 4$$

- I can identify extraneous solutions

**Critical Thinking** How could you determine that  $-2$  was not a solution of  $x = \sqrt{x + 6}$  without going through all the steps of the check?