6.6 Solve Radical Equations

TEKS 2A.9.B, 2A.9.C, 2A.9.D, 2A.9.F

Before You solved polynomial equations.

Now You will solve radical equations.

Why? So you can calculate hang time, as in Ex. 60.

Key Vocabulary
- **radical equation**
- **extraneous solution,** *p. 52*

Equations with radicals that have variables in their radicands are called **radical equations**. An example of a radical equation is $\sqrt[3]{2x + 7} = 3$.

KEY CONCEPT *For Your Notebook*

Solving Radical Equations

To solve a radical equation, follow these steps:

STEP 1 **Isolate** the radical on one side of the equation, if necessary.

STEP 2 **Raise** each side of the equation to the same power to eliminate the radical and obtain a linear, quadratic, or other polynomial equation.

STEP 3 **Solve** the polynomial equation using techniques you learned in previous chapters. Check your solution.

EXAMPLE 1 Solve a radical equation

Solve $\sqrt[3]{2x + 7} = 3$.

$\sqrt[3]{2x + 7} = 3$ Write original equation.

$(\sqrt[3]{2x + 7})^3 = 3^3$ Cube each side to eliminate the radical.

$2x + 7 = 27$ Simplify.

$2x = 20$ Subtract 7 from each side.

$x = 10$ Divide each side by 2.

CHECK Check $x = 10$ in the original equation.

$\sqrt[3]{2(10) + 7} \stackrel{?}{=} 3$ Substitute 10 for x.

$\sqrt[3]{27} \stackrel{?}{=} 3$ Simplify.

$3 = 3$ ✓ Solution checks.

GUIDED PRACTICE for Example 1

Solve the equation. Check your solution.

1. $\sqrt[3]{x} - 9 = -1$ **2.** $\sqrt{x + 25} = 4$ **3.** $2\sqrt[3]{x - 3} = 4$