

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.

$$\sqrt[3]{x-9} = -1$$

$$(\sqrt[3]{x-9})^3 = (-1)^3$$

$$x-9 = -1$$

$$(\sqrt[3]{x+25})^3 = 4^3$$

$$x+25 = 64$$

$$x = 39$$

$$\sqrt[3]{x-9} = -1$$

$$(\sqrt[3]{x-9})^3 = (-1)^3$$

$$x-9 = -1$$

$$x = 8$$

$$2\sqrt[3]{x-3} = 4$$

$$(\sqrt[3]{x-3})^3 = 2^3$$

$$x-3 = 8$$

$$x = 11$$

$$\frac{7x^{3/5}}{7} = \frac{56}{7}$$

$$(x^{3/5})^{5/3} = 8^{5/3}$$

$$x = (\sqrt[3]{8})^5 = 2^5 = 32$$

$$(x-4)^{2/3} - 9 = 16$$

$$[(x-4)^{2/3}]^{3/2} = (25)^{3/2}$$

$$x-4 = (\sqrt{25})^3$$

$$x-4 = 125$$

$$x = 129$$

DO NOT ADD 4!

Solve Radical Equations (cont.)

$$-5\sqrt{x+1} + 12 = 2$$

$$\frac{-5\sqrt{x+1}}{-5} = \frac{-10}{-5}$$

$$(\sqrt{x+1})^2 = 2^2$$

$$x+1=4$$

$$x=3$$

$$x^2 = (\sqrt{4x-3})^2$$

check:

$$x=3$$

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

$$3 = \sqrt{9}$$

$$x=1:$$

$$1 = \sqrt{4 \cdot 1 - 3}$$

$$1 = \sqrt{1}$$

$$x^2 = 4x - 3$$

$$x^2 - 4x + 3 = 0$$

$$(x-3)(x-1) = 0$$

$$x-3=0 \quad x-1=0$$

$$x=3 \quad x=1$$

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

check: $x=5$

$$5-3 = \sqrt{5-1}$$

$$2 = \sqrt{4}$$

$$x=2:$$

$$2-3 = \sqrt{2-1}$$

$$-1 = \sqrt{1}$$

principle $\sqrt{\quad}$ only

$x=2$ is

extraneous

$$(x-3)^2 = (\sqrt{x-1})^2$$

$$(x-3)(x-3) = x-1$$

$$x^2 - 6x + 9 = x - 1$$

$$x^2 - 7x + 10 = 0$$

$$(x-5)(x-2) = 0$$

$$x=5 \quad x=2 \text{ extraneous}$$

p. 456/ # 3 - 8, 13 - 17, 23-25, 32-35, 45, 56, 57

Due Thursday

Reminder: p. 449/ # 11 - 20, Sketch, number appropriately, state domain and range, compare to parent graph
35, 36, 38, 39 - due Wednesday, February 11