

Notes:

Radical Equations

A **Radical Equation** is an equation with a radical sign.

Examples of radical equations:

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

$$\sqrt{x+3} - 6 = 8$$

$$2\sqrt{3x+1} - 4 = 6$$

Steps to Solving Radical Equations

1. **Isolate** the radical to one side of the equal sign.
 2. **Square** both sides of the equation to get rid of the square root.
- ** SQUARE SIDES, NOT TERMS ****
2. **Solve** the equation.
 3. Check your answer(s) with a calculator.

Cut along dotted line.

Example 1: Solve

Check

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

$$\frac{2x}{2} = \frac{16}{2}$$

$$x = 8$$

$$\sqrt{2(8)} = 4$$

$$\sqrt{16} = 4$$

$$4 = 4 \checkmark$$

Keep in mind:

$$(\sqrt{3})^2 = \sqrt{3} \cdot \sqrt{3} = 3$$

because $\sqrt{9} = 3$

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

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Glue on page 56

HW: red text p. 548 & 549 #s 13-37 (1st column) use pages 57-59



Example 2: Solve

$$\sqrt{5x+1}+2=6$$

$$\sqrt{5x+1} = 4$$

$$5x+1=16$$

$$5x = 15$$

$$x = 3$$

Check

$$\sqrt{5(3)+1}+2=6$$

$$\sqrt{16}+2=6$$

$$4+2=6$$

$$6=6 \checkmark$$

Example 3: Solve

$$(\sqrt{14m^2+32})^2 = (4m)^2$$

$$14m^2+32 = 16m^2$$

$$\frac{32}{2} = \frac{16m^2}{2}$$

$$\sqrt{16} = \sqrt{m^2}$$

$$\pm 4 = m$$

2 answers

Check

$$\sqrt{14(-4)^2+32} = 4(-4)$$

$$\sqrt{224+32} = 16$$

$$\sqrt{256} = 16 \checkmark$$

$$\sqrt{14(-4)^2+32} = 4(-4)$$

$$\sqrt{224+32} = 16$$

$$\sqrt{256} = 16 \checkmark$$

Example 4: Solve

$$\left(\sqrt{\frac{2x+9}{5}}\right)^2 = (3)^2$$

$$\frac{2x+9}{5} = 9$$

$$45 = 2x+9$$

$$\frac{36}{2} = \frac{2x}{2}$$

$$x = 18$$

Check

$$\sqrt{\frac{2(18)+9}{5}} = 3$$

$$\sqrt{\frac{36+9}{5}} = 3$$

$$\sqrt{\frac{45}{5}} = 3$$

$$\sqrt{9} = 3$$

$$3 = 3 \checkmark$$

Example 5: Solve

$$\sqrt{11x^2-63-2x} = 0$$

$$11x^2-63-2x = 0$$

$$(\sqrt{11x^2-63-2x})^2 = (0)^2$$

$$11x^2-63-2x = 0$$

$$\frac{-63 \pm \sqrt{77x^2-77}}{-7}$$

$$\sqrt{9} = \sqrt{x^2}$$

$$\pm 3 = x$$

Example 6: Solve

$$14 = \sqrt{\frac{7h}{3}} + 2$$

$$12 = \sqrt{\frac{7h}{3}}$$

$$144 = \frac{7h}{3}$$

$$7h = 144(3)$$

$$\frac{7h}{7} = \frac{432}{7}$$

$$h = \frac{432}{7}$$