

Solving Radical Equations

$$(\sqrt{2x+1})^2 = (5)^2$$

$$2x+1 = 25$$

$$2x = 24$$

$$x = 12$$

Check:

$$\sqrt{2(12)+1} = 5$$

$$\sqrt{25} = 5 \checkmark$$

You must always check your answers in the original equation.

$$x^2 = (\sqrt{6x+7})^2$$

$$x^2 = 6x+7$$

$$x^2 - 6x - 7 = 0$$

$$(x+1)(x-7) = 0$$

$$x+1=0 \quad x-7=0$$

$$x \neq -1 \quad x = 7$$

Check:

$$7 = \sqrt{6(7)+7}$$

$$7 = \sqrt{42+7}$$

$$7 = \sqrt{49} \checkmark$$

$$-1 = \sqrt{6(-1)+7}$$

$$-1 = \sqrt{-6+7}$$

$$-1 \neq \sqrt{1}$$

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

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

$$x^2 = 12 - 4x$$

$$x^2 + 4x - 12 = 0$$

$$(x+6)(x-2) = 0$$

$$x+6=0 \quad x-2=0$$

$$x = -6$$

$$x = 2$$

Check

$$-6 = 2\sqrt{3-(-6)}$$

$$-6 = 2\sqrt{9}$$

$$-6 \neq 2(3)$$

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

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

$$2 = 2(1) \checkmark$$

$$(x+2)^2 = (\sqrt{3x+16})^2$$

$$(x+2)(x+2)$$

$$x^2 + 2x + 2x + 4 = 3x + 16$$

$$x^2 + 4x + 4 - 3x - 16 = 0$$

$$x^2 + x - 12 = 0$$

$$(x+4)(x-3) = 0$$

$$x+4=0 \quad x-3=0$$

$$x = -4$$

$$x = 3$$

Check:

$$-4+2 = \sqrt{3(-4)+16}$$

$$-2 = \sqrt{-12+16}$$

$$-2 \neq \sqrt{4}$$

$$3+2 = \sqrt{3(3)+16}$$

$$5 = \sqrt{9+16}$$

$$5 = \sqrt{25} \checkmark$$

$$x = 4 + \sqrt{2x-8}$$

$$\begin{array}{r} -4 \\ -4 \end{array}$$

$$(x-4)^2 = (\sqrt{2x-8})^2$$

$$(x-4)(x-4)$$

$$x^2 - 4x - 4x + 16 = 2x - 8$$

$$x^2 - 8x + 16 - 2x + 8 = 0$$

$$x^2 - 10x + 24 = 0$$

$$(x-4)(x-6) = 0$$

$$x-4=0 \quad x-6=0$$

$$x=4 \quad x=6$$

Check:

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

$$4 = 4 + \sqrt{8-8}$$

$$4 = 4 + \sqrt{0} \quad \checkmark$$

$$6 = 4 + \sqrt{2(6)-8}$$

$$6 = 4 + \sqrt{12-8}$$

$$6 = 4 + \sqrt{4}$$

$$6 = 4 + 2\sqrt{1}$$