

Math-3A

Lesson 5-2

Radical Equations

Radical equation: an equation that contains a variable as a radicand. $\sqrt{2x+1} = 5$

To Solve:

a) Single unknown equation:
to find the unknown value that
makes the equation “true”.

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

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

$$2x + 1 = 25$$

$$\begin{array}{cc} -1 & -1 \end{array}$$

$$2x = 24$$

$$\begin{array}{cc} \div 2 & \div 2 \end{array}$$

$$x = 12$$

There are several versions of radical equations, two of which are:

1) Single radical term

$$6 + \sqrt{3x + 2} = 11$$

$$\sqrt{3x + 2} = 5$$

$$(\sqrt{3x + 2})^2 = 5^2$$

$$3x + 2 = 25$$

$$\begin{array}{r} -2 \quad -2 \end{array}$$

$$3x = 23$$

$$\begin{array}{r} \div 3 \quad \div 3 \end{array}$$

$$x = \frac{23}{3}$$

2) Two radical terms that can be set equal to each other

$$2\sqrt{3x} - \sqrt{5x + 7} = 0$$

$$2\sqrt{3x} = \sqrt{5x + 7}$$

$$(2\sqrt{3x})^2 = (\sqrt{5x + 7})^2$$

$$4 * 3x = 5x + 7$$

$$12x = 5x + 7$$

$$7x = 7$$

$$x = 1$$

Solve:

$$\sqrt{x+3} + 5 = 0$$

$$\sqrt{x+3} = -5$$

$$x+3 = 25$$

$$x = 22$$

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

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

$$2-x = x^2$$

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

$$0 = (x+2)(x-1)$$

Check your solution.

$$\sqrt{22+3} + 5 = 0$$

$$\sqrt{25} + 5 = 0$$

$$5 + 5 \neq 0 \quad \text{Extraneous solution.}$$

$$x = -2, 1 \quad \text{Check your solutions.}$$

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

$$\sqrt{4} = 2 \quad \text{Checks.}$$

$$\sqrt{2-(1)} = -(1)$$

$$\sqrt{1} \neq -1 \quad \text{Extraneous solution.}$$

$$x = -2$$

$$x \neq 1$$