Notes: Solving Radical Equations

A radical equation is an equation with a radical sign.

Examples of radical equations:

$\sqrt{x+2} = 4$, $\sqrt{x+3} - 6 = 8$, $2\sqrt{3x+1} - 4 = 6$

1.) Solve: $\sqrt{2x} = 4$

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

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

$x = 8$

Steps:
1.) isolate the radical
2.) Square both sides of the equations to get rid of the square root.
3.) Solve the equation
4.) Check w/ graphing cal.

2.) Solve: $\sqrt{5x+1} + 2 = 6$

$-2 \quad -2$

$(\sqrt{5x+1})^2 = (4)^2$

$5x + 1 = 16$

$-1 \quad -1$

$\frac{5x}{5} = \frac{15}{5}$

$x = 3$

Keep in mind:

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

$\sqrt{9}$

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

3) Solve: $\sqrt{14m^2+32} = 4m$

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

$14m^2+32 = (4m)(4m)$

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

$-14m^2 \quad\quad -14m^2$

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

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

$\pm 4 = m$ * check w/ graphing calc.

type left side in $\boxed{y_1 =}$ & right side in $\boxed{y_2 =}$

check w/ table

1 solution

$4 = m$

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

cross multiply

$\frac{2x+9}{5} = \frac{9}{1}$

$1(2x+9) = 5(9)$

$2x + 9 = 45$

$-9 \quad\quad -9$

$2x =$

5.) Solve: $\sqrt{11x^2-63}-2x=0$

steps
① isolate the $\sqrt{\ }$
② square both sides
③ solve

$$\sqrt{11x^2-63}\cancel{-2x}=0$$
$$\cancel{+2x}\quad +2x$$
$$(\sqrt{11x^2-63})^2=(2x)^2$$
$$11x^2-63=(2x)(2x)$$
$$\cancel{11x^2}-63=4x^2$$
$$-11x^2\qquad -11x^2$$
$$\frac{-63}{-7}=\frac{-7x^2}{-7}$$
$$\sqrt{9}=\sqrt{x^2}$$
$$\pm 3=x$$

← take the square root to get rid of the squaring

↓ check w/ calc.

1 solution $x=3$

6.) Solve: $14=\sqrt{\frac{7h}{3}}+2$

$$-2\qquad -2$$
$$(12)^2=\left(\sqrt{\frac{7h}{3}}\right)^2$$
$$\frac{144}{1}=\frac{7h}{3}$$

cross multiply

$$7h=144(3)$$
$$\frac{7h}{7}=\frac{432}{7}$$
$$h=\frac{432}{7}$$