Chapter 6.6: Solve Radical Equations

Remember these three steps...

1. Isolate the radical
2. Raise both sides to the correct power.
3. Solve the polynomial and check solutions.

Very important

ex. Solve: $\sqrt[3]{2x+7}=3$

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

$2x+7=27$

$-7 \quad -7$

$\frac{2x}{2}=\frac{20}{2}$

$x=10$ → does check

ex. In a hurricane, the mean sustained wind velocity v(in mps) is given by $v(p) = 6.3\sqrt{1013 - p}$ where p is the air pressure(in mb) at the center of the hurricane. Estimate the air pressure at the center of a hurricane when the mean sustained wind velocity is 54.5 meters per second.

$\frac{54.5}{6.3} = \frac{6.3\sqrt{1013-p}}{6.3}$

$8.65^2 = \sqrt{1013-p}^2$

$74.84 = 1013 - p$

$-1013 \quad -1013$

$-938.16 = -p$

$938.16 \approx p$

ex. What is the solution to:

$\frac{4x^{\frac{3}{2}}}{4} = \frac{108}{4}$

$(x^{\frac{3}{2}})^{\frac{2}{3}} = (27)^{\frac{2}{3}}$

$x = \sqrt[3]{27^2}$

$x = 9$

$\frac{4\sqrt{x^3}}{4} = \frac{108}{4}$

$\sqrt{x^3}^2 = (27)^2$

$\sqrt[3]{x^3} = \sqrt[3]{729}$

$x = 9$

ex. Solve: $(x+2)^{\frac{3}{4}} - 1 = 7$

$+1 \quad +1$

$\left((x+2)^{\frac{3}{4}}\right)^{\frac{4}{3}} = (8)^{\frac{4}{3}}$ → Calculator: $8 \wedge (4/3)$

$x + 2 = 16$

$-2 \quad -2$

$x = 14$

check!

$\sqrt[4]{16^3} - 1 = 7$?

$\sqrt[4]{4096} - 1$

$8 - 1 = 7$

ex. Solve: $(x+1)^2 = \sqrt{7x+15}^2$

$(x+1)(x+1) = 7x + 15$

$x^2 + 2x + 1 = 7x + 15$

$-7x - 15 \quad -7x - 15$

$x^2 - 5x - 14 = 0$

$(x-7)(x+2) = 0$

$x = 7, -2$

Two Radicals????? Now what?

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

Method 1:

$2 = 2$

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

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

$-x\ -3 \qquad -3-x$

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

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

$x+2=x^2$

$x^2-x-2=0$

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

$x=2,-1$

Method 2:

graph:

$y_1=\sqrt{x+2}+1$

$y_2=\sqrt{3-x}$

look @ the intersection

$(-1,2)$

Homework: Ch 6.6 pg.456 #'s 4-30eoe,34-50eoe,58