Trig 4.7

Solve radical equations*
Solve radical inequalities

*Algebra 2 Ch.5

radical $\sqrt{}$ $\sqrt[3]{}$ $\sqrt[4]{}$

radical equation

" extraneous solutions " (might have to DQ...)

radical inequality (solutions must be REAL)

Algebra 2:

$\sqrt{x}^2 = 7^2$ $x = 49$

$+\sqrt{\ }$

$\sqrt{x} + 7 = 22$
$-7 \quad -7$

$\sqrt{x}^2 = 15^2$ $x = 225$

$\sqrt{(x+7)} = 15$

$x + 7 = 225$
$-7 \quad -7$

$x = 218$

$\sqrt{218+7} = 15$

$\sqrt{225} = 15$ ☺

$x^2 = 49$

$x = \pm 7$

Always check for extraneous answers!

(Because your solutions must be REAL!)

Solve each equation.

4. $\sqrt{1-4t}=2$

$\left(\sqrt{1-4t}\right)^2=2^2$

$1-4t=4$

$-1 \quad -1$

$-4t=3$

$\frac{-4t}{-4}=\frac{3}{-4}$

$t=-\frac{3}{4}$

$\sqrt{1-4\cdot\frac{3}{4}} \stackrel{?}{=} 2$

$\sqrt{1-\frac{12}{4}} \stackrel{?}{=} 2$

$\sqrt{1-3} \stackrel{?}{=} 2$

5. $\sqrt[3]{x+4}+12=3$

$-12 \quad -12$

$\left(\sqrt[3]{x+4}\right)^3=(-9)^3$

$x+4=-729$

$-4 \quad -4$

$x=-733$

$\sqrt[3]{-733+4}+12 \stackrel{?}{=} 3$

$\sqrt[3]{-729}+12 \stackrel{?}{=} 3$

$-9+12 \stackrel{?}{=} 3$

6. $5+\sqrt{x-4}=2$

$-5 \quad -5$

$\left(\sqrt{x-4}\right)^2=(-3)^2$

$x-4=9$

$+4 \quad +4$

$x=13$ NS

$5+\sqrt{13-4} \stackrel{?}{=} 2$

$5+\sqrt{9} \stackrel{?}{=} 2$

$5+3 \stackrel{?}{=} 2$

Use EWE...good decision making

2 Solve $x = \sqrt{x+7} + 5$.

$-5 \quad -5$

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

$x^2 - 10x + 25 = x + 7$

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

$x^2 - 11x + 18 = 0$

18

-9×-2

-11

$(x-9)(x-2) = 0$

☺ $x - 9$ ~~$x - 2$~~

$9 = \sqrt{16} + 5$

$9 = 4 + 5$

$2 = \sqrt{9} + 5$

$2 = 3 + 5$

$$\sqrt{x-3} + 5 = \sqrt{x-6}$$

3 Solve $4 = \sqrt[3]{x+2} + 8$.

$-8 \qquad -8$

$(-4)^3 = \left(\sqrt[3]{x+2}\right)^3$

$-64 = x+2$

$-2 \qquad -2$

$-66 = x$ ✓

$4 = \sqrt[3]{-66+2} + 8$

$4 = \sqrt[3]{-64} + 8$

$4 = -4 + 8$

4

EWE eeewe!

Rule of thumb: number of √ = number of rounds...

4 Solve $\sqrt{x+10} = 5 - \sqrt{3-x}$.

$(5-\sqrt{3-x})(5-\sqrt{3-x})$

$\sqrt{9} = 5-\sqrt{3+1}$

$3 = 5-2$

$x+10 - 2\cdot 5\sqrt{3-x} - 5\sqrt{3-x} + 3-x$

$x+10 = 28 - x - 10\sqrt{3-x}$

$(2x-18)^2 = (-10\sqrt{3-x})^2$

$4x^2 - 36x - 36x + 324 = 100(3-x)$

$4x^2 - 72x + 324 = 300 - 100x$

$+100x \quad -300 \qquad -300 \quad +100x$

$4x^2 + 28x + 24 = 0$

$\frac{4}{4} \quad \frac{28}{4} \quad \frac{24}{4} \quad \frac{0}{4}$

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

6, 1, 7

$(x+6)(x+1) = 0$

$x = -6 \quad x = -1$

Inequalities: Solutions must be REAL! What would make them not real?
All answers must fall into the zone.

5 Solve $\sqrt{4x + 5} \leq 10$.

4.7 13-27a

43-51all

Solve each inequality.

9. $\sqrt{5x + 4} \leq 8$

10. $3 + \sqrt{4a - 5} \leq 10$

7. $\sqrt{6x - 4} = \sqrt{2x + 10}$

8. $\sqrt{a + 4} + \sqrt{a - 3} = 7$