Algebra II
Section 8-5

SOLVING RADICAL **EQUATIONS**

THINGS TO LOOK FOR:

1) An even root can never equal a negative number.
2) You must check even root problems where there are multiple variables involved.

Question??? When solving an equation,
how do you get rid of an addition?
how do you get rid of a multiplication?

so…how do you get rid of a(square root?)^2 A(cubed root?)^3 A(fourth root?)^4

EXAMPLES:

multiple variables, must check it!

1) $\sqrt{2y+3}=7$

$(\sqrt{2y+3})^2=(7)^2$
$2y+3=49$
$2y=46$
$y=23$

2) $-3=\sqrt[3]{y-2}$

$(-3)^3=(\sqrt[3]{y-2})^3$
$-27=y-2$
$-25=y$

THE ONLY RULE: 1) Must get the radical by itself *first* before squaring, cubing, etc.

3) $\sqrt[4]{3n-4}=\sqrt[4]{n-2}$

$(\sqrt[4]{3n-4})^4=(\sqrt[4]{n-2})^4$
$3n-4=n-2$
$2n-4=-2$
$2n=2$
$n=1$

check it
$\sqrt[4]{3(1)-4}=\sqrt[4]{1-2}$
$\sqrt[4]{3-4}=\sqrt[4]{-1}$
stop, real#'s only

4) $\sqrt{-5n+19}+10=11$

subt. 10 first (must have root by itself)
$(\sqrt{-5n+19})^2=(1)^2$
$-5n+19=1$
$-5n=-18$
$n=3.6$

5) $2x^{1/3}+8=0$

$2\sqrt[3]{x}+8=0$
$2\sqrt[3]{x}=-8$
$\sqrt[3]{x}=-4$
$(\sqrt[3]{x})^3=(-4)^3$
$x=-64$

6) $5=17+3(x-2)^{1/2}$

$5=17+3\sqrt{x-2}$
$-12=3\sqrt{x-2}$
$-4=\sqrt{x-2}$
stop! square roots cannot equal negative answers!

Homework: pg 425 1-3, 11-18, 23-26 or pg 425 11-18, 23-28

THE TOUGH ONE. If there is more than one radical, get the "toughest" one by itself, then…. ????

7) $\sqrt{x-15}=3-\sqrt{x}$

8) $\sqrt{y+3}-\sqrt{y-17}=2$

see next page for #7 & #8

7) $\sqrt{x-15} = 3 - \sqrt{x}$

$(\sqrt{x-15})^2 = (3-\sqrt{x})^2$

$x - 15 = (3-\sqrt{x})(3-\sqrt{x})$

$x - 15 = 9 - 3\sqrt{x} - 3\sqrt{x} + x$

$x - 15 = 9 - 6\sqrt{x} + x$

$-15 = 9 - 6\sqrt{x}$

$-24 = -6\sqrt{x}$

$4 = \sqrt{x}$

$16 = x$

MUST CHECK IT!

$\sqrt{16-15} = 3 - \sqrt{16}$

$\sqrt{1} = 3 - 4$

$1 \neq -1$

Therefore: No Solution!

8) $\sqrt{y+3} - \sqrt{y-17} = 2$

$\sqrt{y+3} = \sqrt{y-17} + 2$

$(\sqrt{y+3})^2 = (\sqrt{y-17} + 2)^2$

$y + 3 = (\sqrt{y-17} + 2)(\sqrt{y-17} + 2)$

$y + 3 = y - 17 + 4\sqrt{y-17} + 4$

$y + 3 = y - 13 + 4\sqrt{y-17}$

$3 = -13 + 4\sqrt{y-17}$

$16 = 4\sqrt{y-17}$

$4 = \sqrt{y-17}$

$16 = y - 17$

$33 = y$

MUST CHECK IT!

$\sqrt{33+3} - \sqrt{33-17} = 2$

$\sqrt{36} - \sqrt{16} = 2$

$6 - 4 = 2$

Checks! Therefore: y = 33