BE-Alg. 2 | Tuesday 10-26-10

FACTOR:

① $16x^2 - 8x + 1$

② $x^2 + 2x - 24$

③ $10x^2 + 13x - 3$

ANS!

① $16x^2 - 8x + 1$

✓ $2ab$ ✓

$(4x-1)^2$ or $(4x-1)(4x-1)$ FOIL ✓

② $x^2 + 2x - 24$

Sum ⇒ 2

Prod ⇒ -24

-4 $+6$

$\therefore (x-4)(x+6)$ FOIL ✓

③ $10x^2 + 13x - 3$

S ⇒ 13

P ⇒ -30

-2 $+15$

$(10x^2 - 2x) + (15x - 3)$

$2x(5x-1) + 3(5x-1)$

$(5x-1)(2x+3)$ FOIL ✓

FTOA Fundamental Theorem of Algebra

Simple Version ⇒ Every polynomial of degree N has N roots (solutions).

(EX) Linear Polynomials ⇒ x^1 ⇒ 1 solutions

Quadratic Poly's ⇒ x^2 ⇒ 2 solutions

⋮ etc.

⋮ ETC.

This will be important to remember as we learn the steps to solve "radical" equations ⇒ equations involving the variable under a radical.

Here are the steps:

1. Get the radical term(s) "by itself" (on one side (or both))
2. "Undo" the radical $(\sqrt{\ })^2$; $(\sqrt[3]{\ })^3$, etc. (follow the GRE)
3. Do checks ⇒ mandatory! (Due to FTOA)

Ex 1 Pg 263 Solve $\sqrt{x+1} + 2 = 4$

$-2 \quad -2$

$\sqrt{x+1} = 2$

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

$x+1 = 4$

$\boxed{x = 3}$

Ck $\sqrt{(\ )+1} + 2 \stackrel{?}{=} 4$

$\sqrt{(3)+1} + 2 \stackrel{?}{=} 4$ ✓

Why MUST checks be done? When you "undo" a radical equation you may change its degree creating false or extraneous solutions. None of your correct solutions may check (⇒ no solution case) or only some may check (discard the false ones), or they may all check.

(Ex) $\sqrt{x+2} + 4 = x$

$\sqrt{x+2} = x - 4$

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

$x + 2 = x^2 - 8x + 16$

$-x - 2 \qquad -x - 2$

$x^2 - 9x + 14 = 0$

SOLVING QUADRATIC EQUATIONS BY FACTORING

$S \Rightarrow -9$

$P = 14$

$-2 \quad -7$

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

WHATEVER VALUE of x MAKES $(x-2)(x-7) = 0$ TRUE MAKES $x^2 - 9x + 14 = 0$ TRUE SINCE THEY ARE EQUAL

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

ZPP $\Rightarrow$ Zero Product Property

$ab = 0 \quad a = 0$ or $b = 0$

$\therefore x = 2$ or $x = 7$

ARE SOLUTIONS TO

$x^2 - 9x + 14 = 0$

CK $x = 2$

$\sqrt{(2)+2} + 4 \stackrel{?}{=} (2)$

$2 + 4 \neq 2$

EXTRANEOUS { FALSE SOLUTION

CK $\sqrt{(7+2)} + 4 \stackrel{?}{=} (7)$

$3 + 4 = 7$ ✓

$\boxed{x = \{7\}}$

(ex) $x = \sqrt{x+20}$

$x^2 = x+20$

$ax^2+bx+c=0$
STANDARD FORM FOR A QUADRATIC EQUATION

$x^2-x-20=0$

Sum $\Rightarrow -1$
Prod $\Rightarrow -20$

$4 \quad -5$

$(x+4)(x-5)=0$

FOIL TO BE SURE FACTORS ARE CORRECT
ZPP $\Rightarrow$ "ZIPPY"

$x=-4,5$

Check for false solutions

CK $x=-4$: $(-4) \stackrel{?}{=} \sqrt{(-4)+20}$

$-4 \neq \sqrt{16}$

FALSE

CK $x=5$: $(5) \stackrel{?}{=} \sqrt{5+20}$

$5=5$ ✓

$\boxed{x=\{5\}}$

If you can't get the RADICAL terms completely ISOLATED (by themselves), make sure all like terms are combined so the equation is as simple as possible before undoing the radical.

Ex 2 pg 263

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

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

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

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

$$-x \quad +15 \quad +15 \qquad -x$$

$$0 = 24-6\sqrt{x}$$

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

$$\sqrt{x} = 4 \quad \therefore x = 16$$

CK $\sqrt{(\ )-15} \stackrel{?}{=} 3-\sqrt{(\ )}$

$\sqrt{(16)-15} \stackrel{?}{=} 3-\sqrt{(16)}$

$1 \neq -1$

NO SOLUTION

Ex 3 Pg 264

$3(5N-1)^{\frac{1}{3}} - 2 = 0$ Cube root, will undo by $(?)^3$

$(5N-1)^{\frac{1}{3}} = \frac{2}{3}$

$\left[(5N-1)^{\frac{1}{3}}\right]^3 = \left(\frac{2}{3}\right)^3 = \frac{2^3}{3^3}$ Group to Power Rule

$5N-1 = \frac{8}{27}$

$5N = \frac{8}{27} + \frac{27}{27} = \frac{35}{27}$

$N = \frac{35}{27} \cdot \frac{1}{5}$ $\therefore N = \frac{7}{27}$

CK $3\left(5\left(\frac{7}{27}\right)-1\right)^{\frac{1}{3}} - 2 \stackrel{?}{=} 0$

$3\left(\frac{35}{27} - \frac{27}{27}\right)^{\frac{1}{3}} - 2 \stackrel{?}{=} 0$

$3\left(\frac{8}{27}\right)^{\frac{1}{3}} - 2 \stackrel{?}{=} 0$

$3\left(\frac{2}{3}\right) - 2 \stackrel{?}{=} 0$

$\frac{6}{3} - 2 = 0$ ✓

$\boxed{N = \frac{7}{27}}$

Homework: {Ch 5-8, Radical Equations and Inequalities}

Pg. 266 #13, 17, 19, 21

PLUS: (A) $x = \sqrt{6-x}$

(B) $\sqrt{5x-6} = x$

(C) $\sqrt{28-3x} = x$

Solve Quadratic Equations By Factoring + 2 PP. Check For False Solutions