DAY 1

Section 5.4 - Solving Quadratics by Sq. Roots

Focus - Solve by Factoring

1) $-18x^2-15x+12=0$

$-3(6x^2+5x-4)=0$

$-3(2x-1)(3x+4)=0$

$x=\frac{1}{2}, x=\frac{-4}{3}$

$-3 \neq 0$ ✓

2) Find the x int:

$y=-x^2+x+12$

$0=-1(x^2-x-12)$

$0=-1(x-4)(x+3)$

$x=4, x=-3$

$-1 \neq 0$ ✓

Solving w/ Sq Roots:

* Any time you place a $\sqrt{}$ into a problem, you must remember a $\pm$.

ex: $x^2=9$

$x^2-9=0$

$(x-3)(x+3)=0$

$x=3, x=-3$

$x^2=9$

$\sqrt{x^2}=\sqrt{9}$

$x=\pm 3$

$x=3, x=-3$

ex: $-5+100x^2=76$

$100x^2=81$

$x^2=\frac{81}{100}$

$\sqrt{x^2}=\sqrt{\frac{81}{100}}$

$x=\pm\frac{9}{10}$

$x=\frac{9}{10}, x=\frac{-9}{10}$

ex: $4(x-2)^2=32$

$(x-2)^2=8$

$\sqrt{(x-2)^2}=\sqrt{8}$

$x-2=\pm\sqrt{4}\cdot\sqrt{2}$

$x-2=\pm 2\sqrt{2}$

$x=2\pm 2\sqrt{2}$

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

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

Completing the Square:

$x^2+6x+9=(x+3)^2$
$x^2+8x+16=(x+4)^2$
$4x^2-12x+9=(2x-3)^2$
} perfect SQ Trinomials

ex: $x^2+14x+\underline{49}$ $=(x+7)^2$

$\left(\frac{b}{2}\right)^2 \rightarrow \left(\frac{14}{2}\right)^2 = 7^2 = 49$

ex: $x^2+16x+\underline{64}=(x+8)^2$

$\left(\frac{16}{2}\right)^2=64$

ex: $x^2+20x+\underline{100}=(x+10)^2$

$\left(\frac{20}{2}\right)^2=100$

ex: $x^2+7x+\underline{49/4}=(x+7/2)^2$

$\left(\frac{7}{2}\right)^2=\frac{49}{4}$

$x^2+bx+\underline{\quad}$
$\left(\frac{b}{2}\right)^2$

You can only CTS if $a=1$!!

ex: $y=x^2-4x+13$
↳ convert to VERTEX FORM by completing the SQ.

1) Isolate the x & x^2. (on the same side!)
$y-13=x^2-4x$

2) Complete the SQ. $\left(\frac{4}{2}\right)^2=4$
$y-13+4=x^2-4x+4$

3) Simplify and factor.
$y-9=(x-2)^2$

4) solve for y.
$y=(x-2)^2+9$
$V(2,9)$

ex: $y = x^2 + 6x - 11$

$y + 11 = x^2 + 6x$

$\downarrow \left(\frac{6}{2}\right)^2 = 9$

$y + 11 + 9 = x^2 + 6x + 9$

$y + 20 = (x+3)^2$

$y = (x+3)^2 - 20$

$V(-3, -20)$

ex: $y = x^2 + 7x - 5$

$y + 5 = x^2 + 7x$

$\downarrow \left(\frac{7}{2}\right)^2 = \frac{49}{4}$

$20/4$

$y + \frac{20}{4} + \frac{49}{4} = x^2 + 7x + \frac{49}{4}$

$y + \frac{69}{4} = x^2 + 7x + \frac{49}{4}$

$y + \frac{69}{4} = \left(x + \frac{7}{2}\right)^2$

$y = \left(x + \frac{7}{2}\right)^2 - \frac{69}{4}$

$V(-7/2, -69/4)$