Completing the Square Guided Notes

Examples of Perfect Trinomial Squares:

* The sign in our factored form will match the "b" *

	Example	Factored Form
①	$x^2+10x+25$	$(x+5)^2$
②	x^2-6x+9	$(x-3)^2$
③	$x^2+24x+144$	$(x+12)^2$
④	$x^2-8x+16$	$(x-4)^2$

How to Create a Perfect Trinomial Square: "complete the Square"

divide "b" by 2 & square it to get the "c" value

Examples:

1) $x^2+14x+\underline{49}$ $14/2=7^2$

2) $x^2+20x+\underline{100}$

3) $x^2-4x+\underline{4}$

4) $x^2+5x+\underline{6.25}$

* C value will ALWAYS be Positive *

How to Solve a Quadratic Equation by Completing the Square:

Steps	Example: $x^2+8x-20=0$
Step 1: Re write the equation so all terms containing "x" are on 1 side	$x^2+8x+\square=20+\square$ (+20 +20)
Step 2: Complete the square & Add to both sides	$x^2+8x+\boxed{16}=20+\boxed{16}$ ($8/2=4^2$)
Step 3: Factor the left & Simplify the Right	$(x+4)^2=36$
Step 4: Square Root Both sides [±]	$(x+4)=\pm 6$
Step 5: Solve for X	$x+4=\pm 6-4$; $6-4$: $\boxed{x=2}$; $-6-4$: $\boxed{x=-10}$

Example 2: $x^2 + 6x - 18 = 0$

$+18 \quad +18$

$x^2 + 6x + \boxed{9} = 18 + \boxed{9}$

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

$(x+3) = \pm 3\sqrt{3}$

$-3 \quad -3$

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

9, 3, 3, 6

$\sqrt{27}$

9×3

33

Example 3: $x^2 + 4x - 4 = 0$

$+4 \quad +4$

$x^2 + 4x + \boxed{4} = 4 + \boxed{4}$

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

$(x+2) = \pm 2\sqrt{2}$

$-2 \quad -2$

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

You Try: $x^2 - 2x - 1 = 0$

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

Example 4: $x^2 - 8x + 36 = 0$

You Try: $x^2 + 6x = -34$

(1) $x^2 - 10x - 26 = 0$

$x = \pm\sqrt{51} + 5$