8.5 "AC" Method of Factoring

(Factoring a Trinomial $ax^2 + bx + c$)

$$ax^2 + bx + c$$

* Completing
FOIL in
Reverse

$$x^2 + 5x + 6$$

$a = 1$ $b = 5$ $c = 6$

__Step #1__ : Set-up your answer with your signs

→ The sign of the last term tells you if the signs will be the same (+) or if the signs will be different (-)

→ If the sign of the last term is positive then the signs in the 2 quantities will be the same. Look at the sign of the 2nd term to see __what__ the signs will be

Examples: $x^2 + bx + c = (x + \_\_)(x + \_\_)$

both
addition signs

Same
signs

$$x^2 - bx + c = (x - \underline{})(x - \underline{})$$

both
subtraction   Same
Signs   Signs

$$x^2 +/- bx - c = (x + \underline{})(x - \underline{})$$

different
Signs

Step #2 : Find factors of "ac" that
have a sum of "b." Use the
table to help you.

Factors of "ac" or (1·6=6)	Sum of "b" (5)
1, 6	7
-1, 6	5
1, -6	-5
2, 3	5
-2, 3	1
2, -3	-1

Step #3 Rewrite the polynomial

$$x^2 + \underline{5x} + 6$$

$$x^2 + \underline{3x + 2x} + 6$$

* Use the two factors you found to rewrite your middle term

Step #4 Factor by Grouping

$$x^2 + 3x + 2x + 6$$
$$(x^2 + 3x) + (2x + 6)$$

* Group the first   * Group the last
2 terms   2 terms

Step #5 Factor the GCF from each group

$$(x^2 + 3x) + (2x + 6)$$
$$x(x + 3) + 2(x + 3)$$

Step #6 Rewrite your factored answer (the GCFs form your 1st quantity & the quantity that repeats forms your 2nd quantity)

$$x(x + 3) + 2(x + 3)$$
$$(x + 2)(x + 3)$$

<u>Step #7</u> : FOIL to check your answer

$$(x+2)(x+3)$$

F   O   I   L

$$x^2 + 2x + 3x + 6$$

$$x^2 + 5x + 6 \quad \checkmark$$