Factoring a trinomial into 2 binomial factors.

Trinomials in this section will be of the form: $ax^2 + bx + c$

Remember: $(2x + 3)(5x + 2)$ Use distributive property to multiply.

$2x \cdot 5x + 2x \cdot 2 + 3 \cdot 5x + 3 \cdot 2$ This is called the **FOIL** method in some textbooks.

First **O**utside **I**nside **L**ast

$10x^2 + 4x + 15x + 6$ Multiply the factors.

$10x^2 + 19x + 6$ Add like terms.

Directions: Factor completely:

Example: $10x^2 + 19x + 6$ Trinomial

Step 1: No common factor(s) Always look for common factor(s) **first**.

Step 2: (5x) (2x) What 2 factors equal $10x^2$ (**F** in FOIL)?

Writer's notation: Try factors whose coefficients are closer in value first !!!! 10x and x are possibilities, but are not used as often.

Step 3: (5x 3) (2x 2) What 2 factors equal 6 (**L** in FOIL)?

Writer's notation: Since 3 and 2 are closer in value than 6 and 1, we have made a good choice. But the 2x and 2 together have a common factor, therefore the factors should be switched so there are no common factor(s) in either binomial.

Step 4: (5x 2) (2x 3) Better choice to factor this polynomial.

$10x^2$ 15x 4x 6 Outside term (15x) and Inside term (4x).

Are these Outside (15x) and Inside (4x) terms correct? **YES!!!**

The second sign (addition) indicates that if we add our **Outside term (15x)** and **Inside term (4x)** to total 19x, our factors would be correct.

$10x^2 + 19x + 6$

Since $15x + 4x = 19x$ we know our factors were placed correctly!

Step 5: Assign appropriate signs:

The combined total of the Outside (15x) and Inside (4x) term will be a **POSITIVE** 19. This would require both the 15x and 4x be positive.

Factored completely: $(5x + 2)(2x + 3)$

Note:

Factor completely: This means that you are expected to **LOOK** for any common factors (GCF) **BEFORE** looking for possible binomial factors. Factoring problems may have either or both of these types.