# *Factoring Trinomials*

**If a trinomial $ax^2 + bx + c$ will not factor by any other method,**
**use *trial and error* to fit it into the F O I L pattern:**

**$(a_1x + c_1)(a_2x + c_2) = (a_1a_2)x^2 + (a_1c_2 + c_1a_2)x + (c_1c_2)$**
**where $a_1a_2 = a$, $a_1c_2 + c_1a_2 = b$, and $c_1c_2 = c$.**

**1. Set up empty parentheses: (  )(  ).**

**2. If a,b,c are positive, then both signs are positive**
**( + )( + ).**
**If b is negative but c is positive, then both signs are negative ( - )( - ).**
**If c is negative, then one sign is positive and the other is negative ( + )( - ).**

**3. Try the factors of a in front positions ($a_1$ )($a_2$ ),**
**and the factors of c in the back positions ( $c_1$)( $c_2$),**
**until the resulting product is the orginal trinomial.**

Example: factor $2x^2 - x - 10$

step 1: ( )( )

step 2: ( + )( - )

step 3: *The factors of 2 are 2 and 1; the factors of 10 are 10 and 1 or 5 and 2:*

$(2x + 10)(x - 1) = 2x^2 + 8x - 10$

$(2x + 5)(x - 2) = 2x^2 + x - 10$

*The second trial is almost correct; only the sign of the middle term is wrong. So we change signs:*

$(2x - 5)(x + 2) = 2x^2 - x - 10$

**The answer is**

**$(2x - 5)(x + 2)$**