4R Factoring Method for Quadratics of the Form:

$ax^2 + bx + c$ (when a is not 1)

THE BASIC STEPS:

Step 1: **Remove** the a, but don't throw it away!
Step 2: Multiply a•c.
Step 3: **Replace** c with the result of step 2 (a•c).
Step 4: Factor the new polynomial (no a, and c is now a•c). Factoring means making ( )( ).
Step 5: **Replace** the a as coefficient to the x in BOTH sets of parentheses.
Step 6: **Reduce** (common factor) the sets of parentheses, if possible.
Step 7: Use FOIL to check to be certain you are correct.

EXAMPLE 1: $2x^2 - 7x + 6$

Step 1: **Remove** the 2.
Step 2: Multiply a•c = 2•6 =**12**.
Step 3: **Replace** c with 12 (the result of step 2), which makes **$x^2 - 7x + 12$**.
Step 4: Factor the new polynomial: $x^2 - 7x + 12$ = **$(x - 4)(x - 3)$**.
Step 5: **Replace** the a as coefficient to both x's: $(\mathbf{2}x - 4)(\mathbf{2}x - 3)$.
Step 6: **Reduce** (common factor) the sets of parentheses, if possible. (2x – 4) can be reduced by 2, so it becomes (x – 2). The other one, (2x – 3), can't be reduced. This gives a final factoring of (x – 2)(2x – 3).
Step 7: Use FOIL to check to be certain you are correct.

EXAMPLE 2: $6x^2 + 11x - 2$

Step 1: **Remove** the 6.
Step 2: Multiply a•c = 6•(–2) = **–12**.
Step 3: **Replace** c with –12 (the result of step 2), which makes **$x^2 + 11x - 12$**.
Step 4: Factor the new polynomial: $x^2 + 11x - 12$ = **$(x + 12)(x - 1)$**.
Step 5: **Replace** the a as coefficient to both x's: $(\mathbf{6}x + 12)(\mathbf{6}x - 1)$.
Step 6: **Reduce** (common factor) the sets of parentheses, if possible. (6x + 12) can be reduced by 6, so it becomes (x + 2). The other one, (6x – 1), can't be reduced. This gives a final factoring of (x + 2)(6x – 1).
Step 7: Use FOIL to check to be certain you are correct.