Factoring Part 3

There are times when we are factoring a trinomial in the form ax^2+bx+c where the leading coefficient is greater than 1. We will use what they call the ***ac method***. We will also need to remember how to factor by grouping.

General Method ax^2+bx+c	**Example** $7x^2-11x-6$
Step 1: Multiply *(a)(c)*	Multiply (7)(-6) = -42
Step 2: Find two integers whose product is *ac* and whose sum is *b*. If this is not possible, then the trinomial is *not factorable*.	Find two integers whose product is 42 and whose sum is -11. Factors of 42: 1, 42 2, 21 3, 14 6,7 The factor pair of 3 and 14 will give us the -11 we need. -14 + 3 = -11
Step 3: Rewrite the middle term (*bx)* using the two numbers found in Step 2 as coefficients.	Rewrite the middle term (-11x) using -14 and +3 as coefficients. $7x^2-14x+3x-6$
Step 4: Factor by grouping the first two terms and the last two terms.	Factor by grouping: $7x^2-14x+3x-6$ $(7x^2-14x)(+3x-6)$ $7x(x-2)+3(x-2)$ $(x-2)(7x+3)$

$12x^2 - 38x + 20$

$2(6x^2 - 19x + 10)$

$ac = 6(10) = 60$

Factor pairs:

1, 60 2, 30 3, 20 4, 15 5, 12 6, 10

The pair 4 and 15 will give me -19 $\rightarrow -4 - 15 = -19$

$6x^2 - 4x - 15x + 10$

$(6x^2 - 4x)(-15x + 10)$

$2x(3x - 2) - 5(3x - 2)$

$2(3x - 2)(2x - 5)$

Difference of Two Squares – When both terms are perfect squares, use the formula for the difference of two squares to factor the binomial.

$$x^2 - a^2 = (x + a)(x - a)$$

$$4x^2 - 9 = (2x + 3)(2x - 3)$$

Difference and Sum of Cubes – Follow the formula to complete the difference and sum of cubes.

Sum of Cubes

$x^3 + a^3 = (x + a)(x^2 - ax + a^2)$

Difference of Cubes

$x^3 - a^3 = (x - a)(x^2 + ax + a^2)$

$64x^3 + 27y^3$

$x = 4x$

$a = 3y$

$(4x + 3y)(16x^2 - 12xy + 9y^2)$

$x^6 - y^9$

$(x^2 - y^3)(x^4 + x^2y^3 - y^6)$

For the difference of two squares and the difference and sum of cubes, follow the formulas!