Objective: **Factoring with leading coefficient of 1**
(no number in front of the first term)

Review Examples: Multiply the following.

a) $(x+3)(x+5)$ b) $(n-7)(n-4)$ c) $(t-2)(t+9)$

d) Look at your answers. How do the numbers in your answer relate to the numbers in the factors?

Factoring a Trinomial of the Form x^2+bx+c **(the leading coefficient is 1):**
1. **Always check for a GCF first!** If there is a GCF, factor it out.
2. Multiply a and c. Find the factors of ac.
3. Find the factors of ac that add to **b.**
4. Rewrite the middle term **bx** as **1st # · x + 2nd # · x.**
5. Factor the resulting polynomial by grouping.
6. If there are no numbers that multiply to **c** and add to **b,** the polynomial is prime.

Shortcut (This only works if there is no number in front of the first term.) The leading coefficient must be 1.
1. Find two numbers that multiply to **c** and add to **b.**
2. The factored form of x^2+bx+c is $(x+\text{1st \#})(x+\text{2nd \#}).$
3. The factored form of x^2-bx+c is $(x-\text{1st \#})(x-\text{2nd \#}).$
4. The factored form of x^2+bx-c or x^2-bx-c is $(x-\text{1st \#})(x+\text{2nd \#}).$
   The larger number will have the sign of the middle term.

Examples: Factor the following polynomials.

a) $x^2+11x+30$ b) $m^2+8m+12$

c) $2b^2+40b+144$ d) $q^2-15q+56$

e) $w^2 - 18w + 45$

f) $-5g^2 + 25g - 30$

g) $u^2 + 6u - 9$

h) $t^2 + 6t - 40$

i) $h^3 + h^2 - 12h$

j) $n^2 - 5n - 6$

k) $x^2 - 3x - 10$

l) $3x^2 - 6x + 15$

m) $x^2 - 4$

o) $3x^2 - 27$

p) $x^2 + 144$