We have seen how to factor polynomials by factoring out the GCF. Sometimes we may need to factor out more than the GCF. For right now we will look at factoring trinomials. When we took a product of two binomials, the foil method usually produced a trinomial. This means that if we are factoring a trinomial, we should look for two binomial factors.

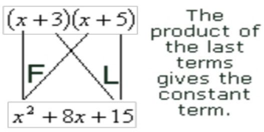
FACTORING TRINOMIALS WHOSE LEADING COEFFICIENT IS 1

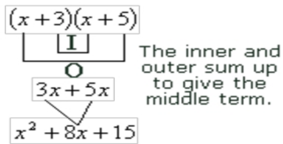
In this chapter, we will focus on techniques for factoring polynomials of the form: x^2+bx+c.
In the next section we will look at the general second degree polynomial: ax^2+bx+c.

Let's review what should know in order to prepare us for the topic today.

FACTORED FORM	FOIL	TRINOMIAL FORM
$(x+3)(x+5)$	$x^2+3x+5x+15$	$x^2+8x+15$
$(x+3)(x-5)$	$x^2+3x-5x-15$	$x^2-2x-15$
$(x-3)(x+5)$	$x^2-3x+5x-15$	$x^2+2x-15$
$(x-3)(x-5)$	$x^2-3x-5x+15$	$x^2-8x+15$

We are use to starting in factored form and multiplying to get it into the trinomial form. We want to learn how to reverse the process and write it in factored form.





The product of 5 and 3 is 15 and their sum is 8.

FACTORING TRINOMIALS WHOSE LEADING COEFFICIENT IS 1

Noticing the pattern we can generalize the procedure to factor a trinomial of the form x^2+bx+c:

1.) The only way to get x^2 is to have an x as the first term in each factor.

$$x^2+bx+c=(x\quad)(x\quad)$$

2.) Now we need two numbers whose product is c and whose sum is b. If we can find the two numbers that have product c and sum b then we can factor the polynomial.

If $mn=c$ and $m+n=b$, then $x^2+bx+c=(x+m)(x+n)$

3.) If you can't find these integers, then the polynomial is said to be prime or irreducible.

EXAMPLE: FACTOR THE FOLLOWING

a.) $x^2-6x-27$ b.) $x^2-7x+12$ c.) x^2+x-30

d.) $x^2+19x+70$ e.) x^2+x+1 f.) $x^2-10x+25$