Tips for factoring trinomials of the form x^2+bx+c

1. Some expressions are not factorable – called **prime**.

2. **Always multiply it back out to check** your answer – especially if there are negatives.

3. **General patterns** for factoring x^2+bx+c (b and c are real numbers)

If original trinomial has …	**then the factored form is …**	**example**
all positive terms	$(x+\quad)(x+\quad)$	x^2+5x+6 $=(x+2)(x+3)$
negative middle term *and* positive constant term	$(x-\quad)(x-\quad)$	x^2-5x+6 $=(x-2)(x-3)$
negative constant term (middle term could be either positive or negative)	$(x-\quad)(x+\quad)$	x^2-x-6 $=(x+2)(x-3)$ OR x^2+x-6 $=(x-2)(x+3)$

This is nice to keep in mind but do not memorize this list. Play around with other examples and try to understand it. You can then recall these general ideas when factoring.

4. **Always factor out the GCF** from all terms before you attempt to factor using the methods shown for trinomials.

example: Factor $2x^2-42x+196$.

We *could* start off by writing $(2x-\quad)(x-\quad)$ and then try pairs of factors of 196 for the two blank spots. But there is an easier way…

$2x^2-42x+196$
$=2(x^2-21x+98)$
$=2(x-\quad)(x-\quad)$

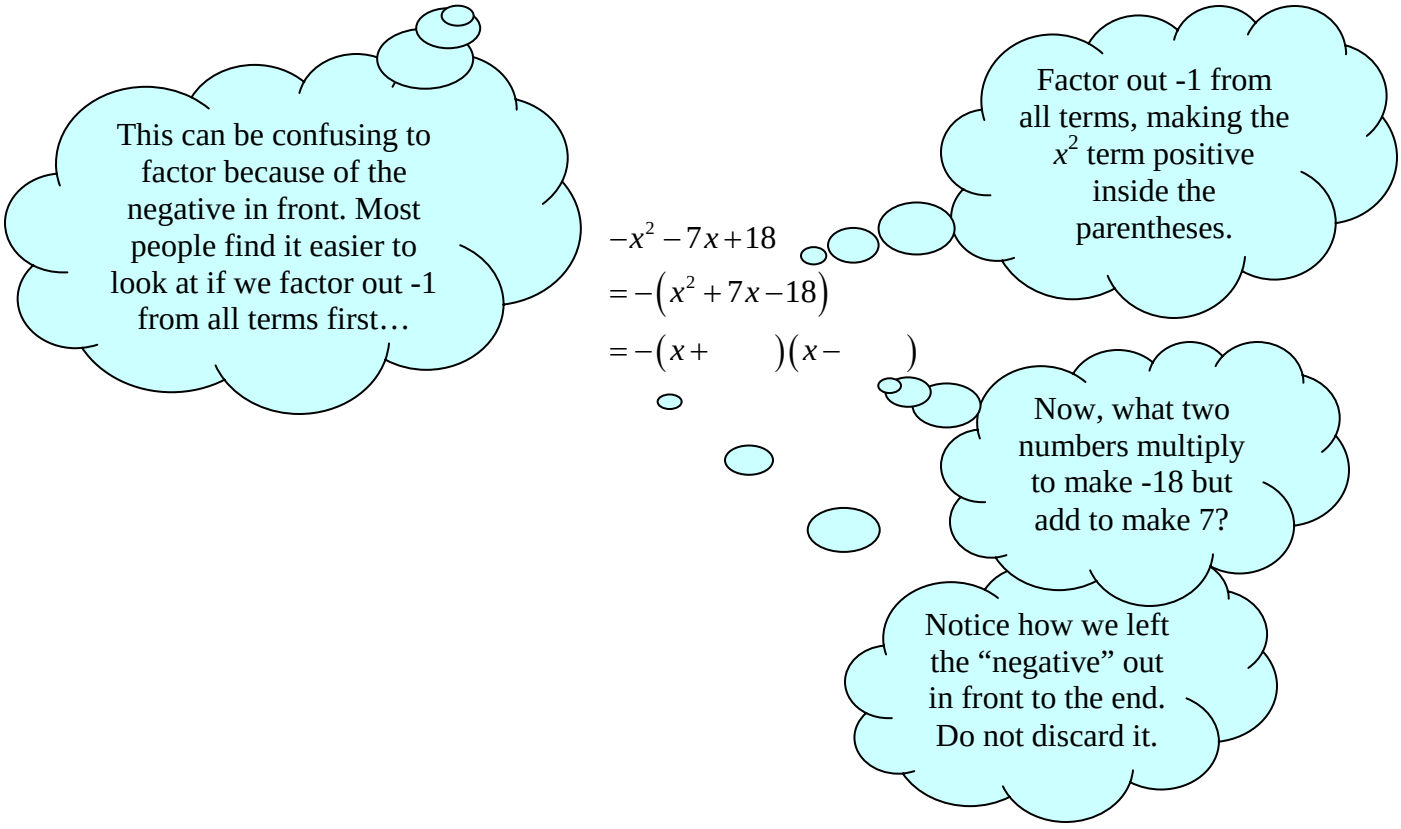
First, factor out the common 2. What's left over will be easier to factor!

Now, what two numbers multiply to make 98 but add to make -21?

If the expression was $2x^3-42x^2+196x$, what would we want to factor out first?

5. In the same vein as number 4, **if the x^2 term is negative, factor out -1 from all terms** before you attempt to factor using the methods shown for trinomials.

example: Factor $-x^2-7x+18$.



6. Use the **Divisibility rules handout** to help you determine the factors of a number. Remember, a number is a factor of another if, when you divide them, you get an integer. (Integers are the whole numbers and their negatives or $\{...,-3,-2,-1,0,1,2,3,...\}$.)

example: What are the factors of 45?

Pairs of factors are 1 & 45, 3 & 15, and 5 & 9. When I divide 45 by any of these factors, I get an integer. Notice, when you divide 45 by 2, you get 22.5 which is not an integer. So 2 is not a factor of 45.