Recall: Use FOIL to multiply \((x-2)(x+3)\)

We can then factor the resulting trinomial, which is like performing “reverse FOIL”:

Many trinomials factor into two binomials. If we watch the signs in the trinomial, factoring will be easier to perform.

For example,

\[ x^2 + 2x + 1 = ( \quad ) ( \quad ) \]

\[ x^2 - 8x + 7 = ( \quad ) ( \quad ) \]

\[ x^2 + 6x - 7 = ( \quad ) ( \quad ) \]

\[ x^2 - 9x - 10 = ( \quad ) ( \quad ) \]

We are going to factor trinomials of the form \(x^2 + bx + c\). Notice that the coefficient of the \(x^2\) term here is _______. You must always first find a GCF and factor it out! Then, we can proceed by finding product/sum values to try to factor \(x^2 + bx + c\).
Example 1: Factor $x^2 + 6x + 5$.

1. Write the first terms of the binomials. $(\quad)(\quad)$

2. We need two factors of $c$ ($c = 5$ here) that sum to $b$ ($b = 6$ here) (consider the signs needed for the numbers from step 1.)

   Factors of 5 (need both factors to be positive here) \hspace{1cm} Sum (want a 6)

3. Choose the pair of factors that sum to 6 and place them in the binomials. $(\quad)(\quad)$

4. Use FOIL to check your factoring!

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\]

Example 2: Factor $x^2 + 7x - 30$.

Example 3: Factor $x^2 - 7x + 5$.

Remember that not all polynomials are factorable!
Example 4: Factor the following trinomials. If they are not factorable at all, write “prime”.

*Hint:* When factoring out a GCF, always try to keep the $x^2$ term positive.

a) $-2t^2 - 20t - 50$

b) $x^2 - 11xy + 30y^2$

c) $x^3 - x^2 - 56x$

d) $3x^2 - 6xy - 72y^2$