Factoring $ax^2 + bx + c$

Review: Factor the following completely. $-2x^2 + 18x - 16$

Notice that when we factor out the GCF, the coefficient of the $x^2$ term here is _______. In this section we’re going to explore trinomials in which $a$, the coefficient of the $x^2$ term, is a real number other than 1.

**Factoring Trinomials** $ax^2 + bx + c$ (into two binomials):

**Method I: “Reverse” FOIL (or Trial and Error)**
- Product of first terms must be $ax^2$, the sum of the products of the outside and inside terms must be $bx$, and the product of the last terms must be $c$
- Use this method when $a = 1$ or if you prefer this to method II in other cases

**Example 1:** Factor the following by “Reverse” FOIL.

a. $8x^2 + 17x + 9$

b. $21y^2 - 41y + 10$
Method II: “AC” Method (or Grouping)
- Find the product ac
- Find 2 factors of ac that sum to b
- Rewrite the middle term as a sum of terms, using the factors from second step as the coefficients
- Factor by grouping
- Use this method instead of method I, if preferred

Example 2: Factor the following completely.

a. \(2x^2 + 7x + 5\)

Find \(ac = \) __________.

Need 2 factors of ________ that sum to ________.

Rewrite \(2x^2 + 7x + 5\) as:

Factor by grouping.

b. \(6x^3 - 31x^2 + 5x\)

Find \(ac = \) __________.

Need 2 factors of ________ that sum to ________.

Rewrite \(6x^2 - 31x + 5\) as:

Factor by grouping.