A C Method

The AC Method is a method of factoring trinomials in the form $\mathbf{ax^2 + bx + c}$.
It forms an alternative to the "guessing method."

Given a quadratic expression with the terms $\mathbf{ax^2 + bx + c}$, we are often asked to factor.
What we are being asked to do is find two expressions, which multiply to give the original expression.

Example: $2x^2 - 11x + 5$

Step 1: Factor any common terms. Then identify a, b, and c.
In our example, $a = 2$, $b = -11$, and $c = 5$.

Step 2: Multiply a and c.
In our example, $ac = 10$.

Step 3: What are all of the factors of ac?
Since ac = 10, what two numbers can we multiply to get 10 back?
*In our case, (1 * 10), (-1 * -10) or (2 * 5), (-2 * -5) would be the answer.*

Step 4: If ac is positive, ***add*** the factors to form the number b.
If ac is negative, ***subtract*** the factors to form the number b.
*Since 10 is positive, we look for factors which **add** to -11.*
Thus, we choose -10 and -1 as our factors.

Step 5: Replace the middle term with the new terms from step 4.
We replace (-11x) with (-10x) and (-1x) to yield:
$2x^2 - 10x - 1x + 5$.
Note that we used -10 and -1.
This is so that if we add them back together, we get the original b = -11 back.

Step 6: Group the equation into two separate parts.
$(2x^2 - 10x) + (-1x + 5)$.
The -1 is included in the second parenthesis.
*The two new terms are joined by an **addition** sign.*

Step 7: Find the common factors in each group.
Factor them to the front of their group.
$2x(x - 5) + -1(x - 5)$.

Step 8: If Step 7 is performed correctly,
Then the first and second terms should have a common factor.
In our case, it is $(x - 5)$.
Factoring this out gives us $(x - 5)(2x - 1)$.

Step 9: Check your answer in Step 8 by multiplying the two factors,
With the FOIL method; **F**irst, **O**utside, **I**nside, **L**ast.
$(x - 5)(2x - 1)$
$= 2x^2 - x - 10x + 5$
$= 2x^2 - 11x + 5$ (our original problem)
Now we know that the factors are:
$(x - 5)$ and $(2x - 1)$.

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