A C METHOD

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

Given a quadratic expression with the terms $ax^2 + bx + c$, 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 this case, $ac = 10$.

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

Step 4: a) Now find the pair of factors whose sum is equal to b.
b) Create two new terms where the factors found in step 4a are the coefficients.
Since 10 is positive, we look for factors which ***add*** to -11. Thus, we choose -10 and -1 as our factors. The two new terms will be -10x and -1x.

Step 5: Replace the middle term with the new terms from step 4.
We replace $(-11x)$ with $(-10x)$ and $(-1x)$ to yields
$2x^2 - 10x - 1x + 5$.
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 and the two new terms are joined by an addition sign.

Step 7: Find the common factors in each group and 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 $(x-5)$. Now factoring this out to the front gives us $(x - 5)(2x - 1)$.

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