

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: 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 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

$$2x^2 - 11x + 5 \text{ are } (x-5) \text{ and } (2x - 1).$$