The ac method

① We want to find two numbers whose product is $a \cdot c$ and whose sum is b.

② Break down the middle term using the two numbers you found as coefficients.

③ Factor by grouping

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ex. Factor the polynomial $6x^2 - 11x - 7$

$a = 6 \quad b = -11 \quad c = -7$

$6x^2 + 3x - 14x - 7$

Prod $a \cdot c$	Sum
$6 \cdot (-7)$	-11
-42	
$3 \quad -14$	-11

$= 3x(2x+1) - 7(2x+1)$

$= \boxed{(2x+1)(3x-7)}$

factored !!

ex. Sometimes you are asked to go a step further and solve an equation for x.

ex. Solve $x^2 - 13x - 30 = 0$

$x^2 - 15x + 2x - 30 = 0$

$x(x-15) + 2(x-15) = 0$

$(x-15)(x+2) = 0$

$x - 15 = 0$ $\quad$ $x + 2 = 0$

$\boxed{x = 15}$ $\quad$ $\boxed{x = -2}$

① Zero must be on one side

② factor other side

prod $1 \cdot (-30)$ sum

-30 $\quad$ -13

$-15 \mid 2$ $\quad$ -13

③ use zero factor property to solve

If $a \cdot b = 0$, then $a = 0$ or $b = 0$

Special products

Difference of two squares

$a^2 - b^2 = (a-b)(a+b)$

ex. Factor $9x^2 - 4 = (3x)^2 - (2)^2$

$= \boxed{(3x+2)(3x-2)}$

Perfect Squares

$a^2 + 2ab + b^2 = (a+b)^2$

$a^2 - 2ab + b^2 = (a-b)^2$

ex. $4x^2 + 12x + 9$

$(2x)^2 + 2(2x)(3) + (3)^2 = \boxed{(2x+3)^2}$