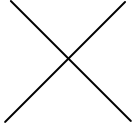


Factoring Trinomials

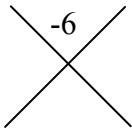
$ax^2 + bx + c$

Make an x:

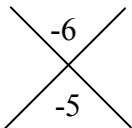


$$2x^2 - 5x - 3$$

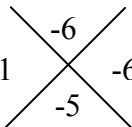
Multiply the coefficient of x^2 and the constant term: $(2)(-3) = -6$ putting the number in the top of the x:



Put the coefficient of x in the bottom of the x:



On the right and left side, put the two numbers that multiply together to equal the top number and that add together to give you the bottom number:



Rewrite your expression with the new coefficients of x you have created in your diagram:

$$2x^2 - 5x - 3$$

$$= 2x^2 + 1x + -6x - 3$$

Group your x^2 term with your first x term and your second x term with your constant term using parentheses:

$$= (2x^2 + 1x) + (-6x - 3)$$

Factor each group completely:

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

Factor out the common binomial factor:

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

$$2x^2 - 5x - 3 = (2x + 1)(x - 3)$$

Success!

Here are some more examples:

$$4x^2 - 36$$
$$= 4x^2 + 0x - 36$$

$$(4)(-36) = -144$$

$$\begin{array}{c} \diagdown -144 \diagup \\ \diagup 0 \diagdown \end{array}$$

$$\begin{array}{c} \diagdown -144 \diagup \\ \diagup -12 \diagdown \quad 12 \\ \quad \quad \quad 0 \end{array}$$

$$4x^2 + 0x - 36$$
$$= 4x^2 - 12x + 12x - 36$$
$$= (4x^2 - 12x) + (12x - 36)$$
$$= 4x(x - 3) + 12(x - 3)$$
$$= (x - 3)(4x + 12)$$
$$4x^2 - 16 = (x - 3)(4x + 12)$$

$$3x^2 - 4x - 15$$

$$(3)(-15) = -45$$

$$\begin{array}{c} \diagdown -45 \diagup \\ \diagup -4 \diagdown \end{array}$$

$$\begin{array}{c} \diagdown -45 \diagup \\ \diagup -9 \diagdown \quad 5 \\ \quad \quad \quad -4 \end{array}$$

$$3x^2 - 4x - 15$$
$$= 3x^2 - 9x + 5x - 15$$
$$= (3x^2 - 9x) + (5x - 15)$$
$$= 3x(x - 3) + 5(x - 3)$$
$$= (x - 3)(3x + 5)$$
$$3x^2 - 4x - 15 = (x - 3)(3x + 5)$$