



FOIL

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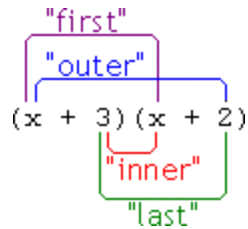


Definition of FOIL

The FOIL method is a special method for multiplying a two-term polynomial, or binomial by another binomial.

FOIL can ONLY be used for the special case of multiplying two binomials. It can NOT be used at ANY other time!

FOIL is an acronym. The letters F-O-I-L come from the words "first", "outer", "inner", "last", and are a memory device for helping you remember how to multiply horizontally. Here is what FOIL stands for:



That is, FOIL tells you to multiply the first terms in each of the parentheses, then multiply the two terms that are on the "outside" (furthest from each other), then the two terms that are on the "inside" (closest to each other), and then the last terms in each of the parentheses.

Examples:

a) Simplify: $(x + 3)(x + 2)$

First: $(x) * (x) = x^2$

Outer: $(x) * (2) = 2x$

Inner: $(3) * (x) = 3x$

Last: $(3) * (2) = 6$

Answer: $(x + 3)(x + 2) = x^2 + 2x + 3x + 6 = x^2 + 5x + 6$



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b) Simplify $(x - 4)(x - 3)$

First: $(x) * (x) = x^2$

Outer: $(x) * (-3) = -3x$

Inner: $(-4) * (x) = -4x$

Last: $(-4) * (-3) = +12$

Answer: $(x^2) + (-3x) + (-4x) + (+12) = x^2 - 7x + 12$

c) Simplify: $(x - 3y)(x + y)$

First: $(x) * (x) = x^2$

Outer: $(x) * (y) = xy$

Inner: $(-3y) * (x) = -3xy$

Last: $(-3y) * (y) = -3y^2$

Answer: $(x^2) + (xy) + (-3xy) + (-3y^2) = x^2 - 2xy - 3y^2$

REMEMBER: "FOIL" works ONLY for the specific and special case of a two-term expression times another two-term expression. It does NOT apply in ANY other case.

Reference: <http://www.purplemath.com/modules/FOIL>