

Special Binomial Products

Square of a Binomial:

In general for all real numbers a and b,

Square of a Sum: $(a+b)^2 = (a+b)(a+b) = a^2 + 2ab + b^2$ NOT $a^2 + b^2!$

Example: $(3y+4)^2 = (3y+4)(3y+4) = 9y^2 + 2(3y \cdot 4) + 16 = 9y^2 + 24y + 16$

Square of a Difference: $(a-b)^2 = (a-b)(a-b) = a^2 - 2ab + b^2$ NOT $a^2 - b^2!$

Example: $(3y-4)^2 = (3y-4)(3y-4) = 9y^2 - 2(3y \cdot 4) + 16 = 9y^2 - 24y + 16$

What happens when you multiply these?

$$(x-6)(x+6)$$

$$(3a+2b)(3a-2b)$$

$$(x^2+3)(x^2-3)$$

Product of a Sum & Difference: $(a+b)(a-b) = a^2 - ab + ab - b^2 = a^2 - b^2$

difference of squares

Example: $(3y+4)(3y-4) = 9y^2 - 12y + 12y - 16 = 9y^2 - 16$

$(3y+4)(3y-4) = (3y)^2 - (4)^2 = 9y^2 - 16$

TRY: $(2x+3)^2$

$$(2x-3)^2$$

$$(x+3)(x-3)$$

To multiply something like:

$[(x+y)+2][(x+y)-2]$, think of this product of a sum and difference.

$$[(x+y)+2][(x+y)-2] = (x+y)^2 - 4 = x^2 + 2xy + y^2 - 4$$

While it may be useful and more efficient to memorize these special products, one can always arrive at the correct answer by using FOIL.

Challenge: $(2y^t - 3)(4y^t + 7)$