

Algebra - basics and expressions

Algebra and algebraic rules, one of the most commonly used mathematical fields, in MatDeck are incorporated and used as a basis for all sorts of calculations. The principles of a formula's products, factorization, simplification are respected in the calculations and publicly available for further use. Some of the basic formulas and calculations are

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

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

$$(a+b+c)^2 = a^2 + 2ab + 2ac + b^2 + 2bc + c^2$$

$$(a-b-c)^2 = a^2 - 2ab - 2ac + b^2 + 2bc + c^2$$

$$(a+b)^3 = a^3 + 3a^2b + 3ab^2 + b^3$$

$$(a-b)^3 = a^3 - 3a^2b + 3ab^2 - b^3$$

$$(a+b)^4 = a^4 + 4a^3b + 6a^2b^2 + 4ab^3 + b^4$$

$$(a-b)^4 = a^4 - 4a^3b + 6a^2b^2 - 4ab^3 + b^4$$

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

$$(x+a) \cdot (x+b) = x^2 + xa + bx + ba$$

$$(x-a) \cdot (x+b) = x^2 - xa + bx - ba$$

$$(x+a) \cdot (x+b) \cdot (x+c) = x^3 + x^2a + bx^2 + xba + cx^2 + cxa + cbx + cba$$

$$(x+y) \cdot (x^2 - xy + y^2) = x^3 + y^3$$

$$(x-y) \cdot (x^2 + xy + y^2) = x^3 - y^3$$

$$a \cdot (b+c) = ab + ac$$

$$a + (-a) = 0$$

$$a \cdot \left(\frac{1}{a}\right) = 1$$

The above formulas are a result of the MatDeck calculation engine.

Principles and laws of exponents are also incorporated in our calculation engine which result in the following formulas

$$(a^k) \cdot (a^n) = a^{k+n}$$

$$(a \cdot b)^n = b^n a^n$$

$$(a^k)^n = a^{kn}$$

Fractional exponents rules that are used in calculations, results in the following formulas

$$a^0 = 1$$

$$\frac{1}{a^{-n}} = a^n$$

$$\frac{a^k}{a^n} = a^{k-n}$$

$$\frac{1}{a^n} = a^{-n}$$

The principles that we have mentioned above, can be used to calculate and simplify some of the following expressions:

$$6 \cdot (3-x) + 2 \cdot (4x+5) - (x^2)^2 = 2x + 28 - x^4$$

Simplify

$$3 \cdot (x-5) + 4 \cdot (x+4) - 5y = 7x + 1 - 5y$$

$$(3x-2) \cdot (x^2 + 3x-7) = 3x^3 + 7x^2 - 27x + 14$$

Expand

$$(27a^3 \cdot b^2) / (3a \cdot b^4) = 9b^{-2}a^2$$

Division of expressions