# planetmath.org

Math for the people, by the people.

# difference of squares

| | |
|---|---|
| Canonical name | DifferenceOfSquares |
| Date of creation | 2013-03-22 17:45:11 |
| Last modified on | 2013-03-22 17:45:11 |
| Owner | pahio (2872) |
| Last modified by | pahio (2872) |
| Numerical id | 10 |
| Author | pahio (2872) |
| Entry type | Topic |
| Classification | msc 97D99 |
| Classification | msc 26C99 |
| Classification | msc 13A99 |
| Synonym | conjugate rule |
| Related topic | ConjugationMnemonic |
| Related topic | ExampleOnSolvingAFunctionalEquation |
| Related topic | SquareOfSum |
| Related topic | GroupingMethodForFactorizingPolynomials |
| Related topic | IncircleRadiusDeterminedByPythagoreanTriple |
| Related topic | FactoringASumOrDifferenceOfTwoCubes |
| Related topic | Polynomial |
| Related topic | SineOfAngleOfTriangle |
| Related topic | RepresentantsOfQuadraticRe |

One of the most known and used `http://planetmath.org/Equation`formulas of mathematics is the one concerning the product of sum and difference:

$$(a + b)(a - b) = a^2 - b^2 \tag{1}$$

This form may be used for multiplying any sum of two numbers (terms) by the difference of the same numbers (terms).

In the form

$$a^2 - b^2 = (a + b)(a - b) \tag{2}$$

the formula is used for factoring binomials which are the difference of two squares.

(1) is sometimes called the *conjugate rule*, especially in articles written in Sweden (in Swedish: *konjugatregel*).

(1) is an identic equation for all numbers $a$, $b$ and, more generally, for arbitrary elements $a$, $b$ of any commutative ring. Conversely, it is easy to justify that if (1) is true for all elements $a$, $b$ of a ring, then the ring is commutative. By the way, $a+b$ and $a-b$ also commute with each other in a non-commutative ring.