

IDENTITIES

Multiplication of certain types of expressions can be obtained by direct or short cut method. Such multiplications are known as “special products”.

While using direct method, the product of two binomials gives three terms.

- 1ST TERM : Product of first terms of two binomials
- 2ND TERM : (First term of first binomial $\times$ Second term of second binomial) + (Second term of first binomial $\times$ First term of second binomial)
- 3RD TERM : Product of second terms of two binomials

Product of sum and difference of two terms

Product of sum and difference = (First Term)² – (Second Term)²

$$\text{Ex: } (a + b)(a - b) = a^2 - b^2$$

EXPANSION

In the equation $(a + b)^2 = a^2 + b^2 + 2ab$, " $a^2 + b^2 + 2ab$ " is called expansion of $(a + b)^2$.

“IDENTITIES”

- ❖ $(a + b)(a - b) = a^2 - b^2$
- ❖ $(a + b)^2 = a^2 + b^2 + 2ab$
- ❖ $(a - b)^2 = a^2 + b^2 - 2ab$
- ❖ $(a + b)^2 + (a - b)^2 = 2(a^2 + b^2)$
- ❖ $(a + b)^2 - (a - b)^2 = 2(a^2 + b^2)$
- ❖ $(a + b + c)^2 = a^2 + b^2 + c^2 + 2ab + 2bc + 2ac$
- ❖ $(a + b - c)^2 = a^2 + b^2 + c^2 + 2ab - 2bc - 2ac$
- ❖ $(a + \frac{1}{a})^2 = a^2 + \frac{1}{a^2} + 2$
- ❖ $(a - \frac{1}{a})^2 = a^2 + \frac{1}{a^2} - 2$
- ❖ $(a + \frac{1}{a})^2 - (a - \frac{1}{a})^2 = 4$

Cubes of binomials

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