IDENTITIES

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

<u>While using direct method, the product of two binomials gives three terms.</u>

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

<u>Product of sum and difference of two terms</u>

$$Product\ of\ sum\ and\ difference = (First\ Term\ )^2 - (Second\ Term)^2$$

$$Ex: (a+b)(a-b) = a^2 - b^2$$

EXPANSION

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

<u>"IDENTITIES"</u>

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

Cubes of binomials

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