Algebra identities

Difference of squares

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

Difference of Cubes

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

Sum of Cubes

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

Special Algebra Expansions

Formula for $(a+b)^2$ and $(a-b)^2$

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

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

Formula for $(a+b)^3$ and $(a-b)^3$

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

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

Roots of Quadratic Equation

Formula

Consider this quadratic equation:

$ax^2 + bx + c = 0$

Where ***a*** **,** ***b*** and ***c*** are the leading coefficients.

The roots for this quadratic equation will be:

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Arithmetics progression

Arithmetics progression

Consider the following arithmetic progression:

a + (a + d) + (a + 2d) + (a + 3d) + ...

Where;

👉***a*** is the initial term

👉***d*** is the common difference

The n^{th} term

The n^{th} term, T_n of the arithmetic progression is:

$$T_n = a + (n-1)d$$

Sum of the first n term

The sum of the first ***n*** term of the arithmetic progression is:

$$S_n = n/2\{2a + (n-1)d\}$$

Geometric progression

Geometric progression

Consider the following geometric progression:

$$a + ar + ar^2 + ...$$

Where:

👉***a*** is the scale factor

👉***r*** is the common ratio

The n^{th} term

The n^{th} term, T_n of the geometric progression is:

$$T_n = ar^{n-1}$$

Sum of the first n terms

The sum of the ***n*** terms, S_n is:

The sum of the n terms, Sn is:

$$S_n = a(1-r^n)/1-r$$

The sum to infinity

If -1<r<1, the sum to infinity, S_∞ is:

$$S_\infty = a/1-r$$