

Arithmetic & Geometric Progression

Arithmetic Progression

➤ **Series of the form**→

$a, a + d, a + 2d, a + 3d, \dots$

is called Arithmetic Progression, when they increase or decrease by a common difference

e.g.→ 5, 12, 19, 26, 33

Common difference, $d =$

$$12 - 5 = 7$$

$$19 - 12 = 7$$

$$26 - 19 = 7$$

➤ $a_1, a_2, a_3, \dots, T_n$

$d =$ common difference

$=$ Second term - 1st term

$= a_2 - a_1$

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

$a \rightarrow$ 1st term

$n \rightarrow$ no. of terms

$d \rightarrow$ Common difference

➤ **Sum of n terms in A.P**

$$S_n = \frac{n}{2} [2a + (n - 1)d]$$

Or

$$S_n = \frac{n}{2} [\text{First term} + \text{last term}]$$

➤ **Total no. of term**

$$= \frac{\text{Last term} - \text{First term}}{\text{Common difference}} + 1$$



SSC CGL 2017
All Rounder



350+ TOTAL TEST

- 80+ TIER-I MOCKS
- 50+ TIER-II MOCKS
- 200+ SECTIONAL TEST

Bilingual

Geometric Progression

➤ $a, ar, ar^2, ar^3, \dots, ar^{n-1}$

Common Ratio (r) = $\frac{\text{Second term}}{\text{First term}}$

n^{th} term (T_n) = ar^{n-1}

➤ **Sum of G.P, $S_n = \frac{a(r^n-1)}{r-1}$** where $r > 1$

Or

$S_n = \frac{a(1-r^n)}{1-r}$ where $r < 1$

➤ **Sum of an Infinite Geometric Progression when $r < 1$**

$S_\infty = \frac{a}{1-r}$

➤ The figure made by joining the mid-points of a square and the area of thus made square is half the actual square.

➤ The figure made by joining the mid-points of a right-angle triangle is right angle triangle and the area thus made triangle is $1/4^{\text{th}}$ of the actual triangle.

➤ To find the **sum of First n natural number.**

$S = 1 + 2 + 3 + 4 + \dots + n$

$$S = \frac{n(n+1)}{2}$$

➤ To find the **sum of the Squares of the 1st n natural numbers.**

$S = 1^2 + 2^2 + 3^2 + \dots + n^2$

$$S = \frac{n(n+1)(2n+1)}{6}$$

➤ To find the **sum of the cubes of the 1st n natural numbers.**

$S = 1^3 + 2^3 + 3^3 + \dots + n^3$

$$S = \left[\frac{n(n+1)}{2} \right]^2$$

➤ To find the **sum of first n odd natural numbers.**

$S = 1 + 3 + 5 + \dots + (2n-1)$

$$S = n^2$$

➤ To find the **sum of first n even natural numbers.**

$$S = 2 + 4 + 6 + \dots + 2n$$

$$S = n(n + 1)$$

