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Chapter → 5

Sequence & Series → Arithmetic Progression
→ Geometric Progression

⇒ **Arithmetic progression. [AP]**

- diff^n of two Consecutive terms is same.
  दो के बाद दो

$$a,\ a+d,\ a+2d \ldots\ldots$$

1, 2, 3
(a-d), a, (a+d)

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

t_n = last term → n^{th} term.
a = 1st term
n = no. of terms
d = common diff^n

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

$$S_n = \frac{n}{2}[a + l]$$

l = last term.

$t_1 = S_1$

$t_2 = S_2 - S_1$

1₹ = 100 paise

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* term निकालने के लिए → t_n formula
* Sum निकालने के लिए → S_n formula

[AM] Arithmetic Mean = $\frac{\text{1st term + last term}}{2}$.

$$AM = \frac{a+b}{2}$$

$t_p = a$ $\quad t_q = b$ $\quad t_r = ?$

$t_r = a + (r-1)d$

$t_m = n$ $\quad t_n = m$ $\quad t_r = ?$

$t_r = n + (m-r)$

former → पहले वाले

Succeeding → अगला
Preceeding → पिछला

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find numbers from 100 to 300 which are divisible by 7.

100 $\xrightarrow{\div 7}$ 14.2

↓ Perfect no. (पूर्णांक)

105 $\xleftarrow{\times 7}$ 15

300 $\xrightarrow{\div 7}$ 42.85

↑ Perfect no. (पहले वाला)

294 $\xleftarrow{\times 7}$ 42

from
→ 1st & last
लेना है

Between
→ only बिच वाले

Or
~~धरे वाले और 5 से भी~~
~~divisible~~ divisible
by 4 + by 5 — common.

and.
Common one only.

natural no. → 1 to ——

whole no. 0 to . . .

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Geometric Progression [GP]

- ratio of two consecutive no will be constant / same

$a, ar, ar^2, \ldots$

$\frac{t_2}{t_1} = \frac{ar}{a} = r$

$1, 2, 4$

a, ar, ar^2

$\frac{a}{r}, a, ar$

a_1, a_2, ar

a, ar, ar^2

$t_n = a \cdot r^{n-1}$

$t_n =$

$a =$ 1st no.

$r =$ common ratio

$n =$ no. of terms

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

$$S_\infty = \frac{a}{1 - r} \quad [\, r < 1 \,]$$

[GM] Geometric Mean $= \sqrt{ab}$

$\pm\sqrt{3} = 3^{1/2}$

$r^2 - 1 \rightarrow (r-1)(r+1)$

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Sum of squares of natural no.

$1^2, 2^2, 3^2, 4^2 \ldots\ldots n^2$

$$\Sigma n^2 = S_n \Rightarrow \frac{n(n+1)(n+2)}{6}$$

Sum of cubes of natural no.

$1^3, 2^3, 3^3, 4^3 \ldots\ldots n^3$

$$\Sigma n^3 = S_n \Rightarrow \left[\frac{n(n+1)}{2}\right]^2$$

Sum of natural no.

$1, 2, 3, 4 \ldots\ldots n$

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