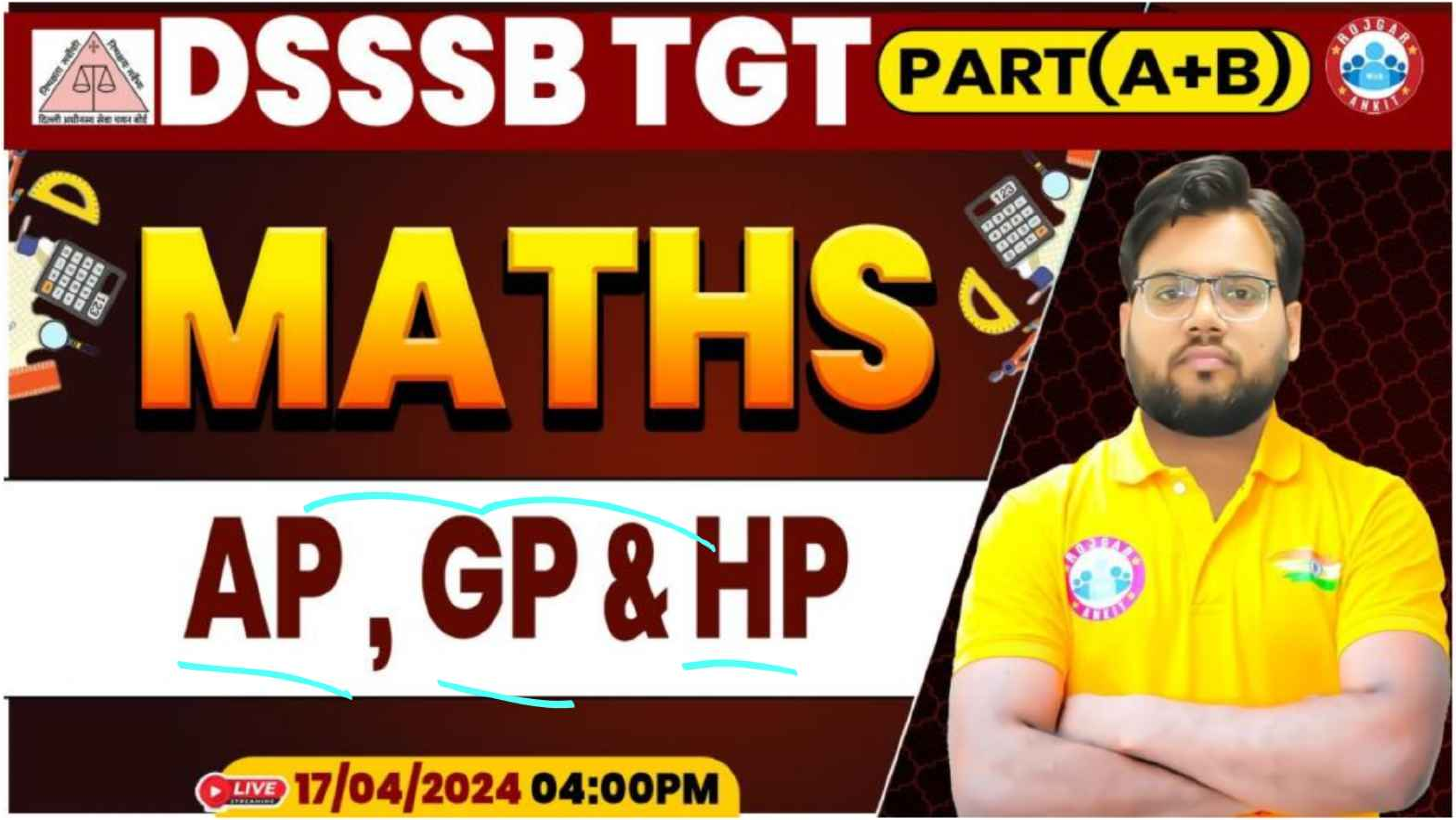
DSSSB TGT
PART(A+B)
ROJGAR ANKIT
MATHS
AP , GP & HP
LIVE
17/04/2024 04:00PM

समानान्तर श्रेणी →

→ $a, a+d, a+2d, a+3d, \ldots\ldots a+nd$

d d d

d = Common difference

Not: In an AP following results are very useful:

(i) $T_n = S_n - S_{n-1}, d = S_2 - 2S_1$

(ii) $\frac{T_n - T_q}{n-q} = \frac{T_p - T_q}{p-q}$

(Useful when T_p, T_q are known and to find T_n)

(iii) $pT_p = qT_q \Rightarrow T_{p+q} = 0$

2, 4, 6, 8, 10, 12, 14, 16, 18, 20

$T_9 = 18 \ (T_p)$, $T_6 = 12 \ (T_q)$

$T_{10} = ? \ (T_n)$

$\frac{T_{10} - 12}{10-6} = \frac{18-12}{9-6}$

$\frac{T_{10} - 12}{4} = \frac{6}{3} = 2 \Rightarrow T_{10} = 20$

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

T - पद S → योग

एक समानान्तर श्रेणी का 22 वाँ पद 88 है। तथा उसका 18 वाँ पद 72 है तो उस श्रेणी का 26 वाँ पद क्या होगा?

$p = 22$, $T_p = 22$ … $q = 18$, $T_q = 72$, T_n ($n = 26$)

T_p T_q

$$\frac{T_n - T_q}{n - q} = \frac{T_p - T_q}{p - q}$$

$$\frac{T_{26} - 72}{26 - 18} = \frac{88 - 72}{22 - 18}$$

$$\frac{T_{26} - 72}{8} = \frac{16}{4} \Rightarrow T_{26} = 32 + 72$$

$$\Rightarrow 104$$

$$\frac{T_{15}-(-19)}{15-4} = \frac{-11-(-19)}{8-4}$$

$$\frac{T_{15}+19}{11} = \frac{+8}{4} 2$$

$T_{15} = 22 - 19$

$\Rightarrow 3$ ✓

$$\frac{T_n - T_q}{n-q} = \frac{T_p - T_q}{p-q}$$

T_1	T_2	T_3	T_4	T_5	T_6	T_7	T_8	T_9	T_{10}	T_{11}	T_{12}	T_{13}	T_{14}	T_{15}	T_{16}
-25,	-23,	-21,	-19,	-17,	-15,	-13,	-11,	-9,	-7,	-5,	-3,	-1	$+1$,	3	5

+2 +2 +2 +2 +2 +2

$p = 8$ $\quad T_p = T_8 = -11$

$q = 4$ $\quad T_q = ? \quad T_4 = -19$

$T_{15} = ?$

$n = 15$ $\quad T_{15} = ?$

(iv) $T_p = q, T_q = p \Rightarrow T_{p+q} = 0, T_n = p + q - n$

(v) $T_p = \frac{1}{q}, T_q = \frac{1}{p} \Rightarrow T_{pq} = 1, S_{pq} = \frac{1}{2}(pq + 1)$

(vi) $S_p = q, S_q = p \Rightarrow S_{p+q} = -(p + q)$

(vii) $S_p = S_q \Rightarrow S_{p+q} = 0.$

1. यदि किसी समानान्तर श्रेणी के n पदों का योग $\frac{1}{8}(n^2 + 3n)$ है तो उस श्रेणी का 8वाँ पद ज्ञात कीजिए।

$$S_n = \frac{1}{8}(n^2 + 3n)$$

$n = 8$

$$S_8 = \frac{1}{8}(64 + 24)$$

$S_8 \Rightarrow 11$

$n = 7$

$$S_7 = \frac{1}{8}(49 + 21)$$

$$S_7 \Rightarrow \frac{70}{8}$$

$$T_8 = S_8 - S_7$$

$$\Rightarrow 11 - \frac{70}{8}$$

$$\Rightarrow \frac{88 - 70}{8}$$

$$\Rightarrow \frac{18}{8} \Rightarrow \frac{9}{4}$$

$$S_n = 3n^2 + 2n^2 + n$$

$$T_n = S_n - S_{n-1}$$

$$T_9 = ?$$

$$T_9 = S_9 - S_8$$

$$\Rightarrow (243 + 162 + 9) - (192 + 128 + 8)$$

$$T_9 \Rightarrow 414 - 328$$

$$86$$

Arithmetic mean: If A be the AM between two number a and b, then

$$A = \frac{1}{2}(a + b)$$

अंकगणितीय माध्य → 7, 12

$A \Rightarrow \frac{7+12}{2} \Rightarrow 9.5$

n AM's between two numbers:

If $A_1, A_2, \ldots, A_n$ be n AM's between a and b, then

$$a, A_1, A_2, \ldots, A_n, b$$

$a,\ a+d,\ a+2d,\ a+3d,\ a+4d \ldots a+nd$

$a, A_1, A_2, A_3, A_4 \ldots A_n, b$

terms $= (n+2)$

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

$T_{(n+2)} = a+(n+2-1)\cdot d$

$b = a+(n+1)\cdot d$

$$d = \frac{b-a}{n+1}$$

$A_4 = ?\quad A_3 = ?\quad A_2 = ?$

Example. For inserting 8 AM's between 25 and 7 we have

23, 21, 19, 17, 15, 13, 11, 9

$25, A_1, A_2, A_3, A_4, A_5, A_6, A_7, A_8, 7$

$d = \frac{7-25}{8+1} \Rightarrow \frac{-18}{9} \Rightarrow -2$

$a \quad a+d \quad a+2d \quad a+3d$

a, A_1, A_2, b

$d = \frac{b-a}{3}$

$A_1 = a+d \Rightarrow a + \frac{b-a}{3}$

$A_1 \Rightarrow \frac{3a+b-a}{3} \Rightarrow \frac{2a+b}{3}$

$A_2 = a+2d \Rightarrow a + 2\frac{(b-a)}{3}$

$\Rightarrow \frac{3a+2b-2a}{3}$

$A_2 \Rightarrow \frac{2b+a}{3}$

If A_1, A_2 be two AM's between *a* and *b* then

$$A_1 = \frac{2a+b}{3},\ A_2 = \frac{a+2b}{3}$$

Sum of n AM's between a and b:

$$= \frac{n}{2}(a+b)$$

Example. The sum of 10 AM's between I and 49.

Assuming Numbers in AP

Example. Find three numbers in AP if their sum is 21 and their product is 231.

Some Standard Formulae for addition

Some Properties of AP

If a constant number is added to (or subtracted from) each term of an AP, then the resulting sequence is also an AP with the same common difference

If each term of an AP is multiplied or divided by a nonzero constant number, then the resulting sequence is also an AP

Geometrical Progression (GP)

A progression is called a GP if the ratio of its each term to its previous term is always constant. This common ratio and it is generally denoted by r.

Standard form:

General term:

Example. $\sqrt{3}$, $1/\sqrt{3}$,$1/3\sqrt{3}$,... is.

Sum of n Terms of a GP

Example. The sum of 10 terms of the GP $1/2 + 1/4 + 1/8 + \ldots\ldots$ is.

Sum of an Infinite GP

Geometric Mean

If G be the GM between a and b, them

$$G = \sqrt{ab}$$

n GM's between two numbers:

If G_1, G_2, ..., G_n be n GM's between two numbers a and b, then a, G_1, G_2, ..., G_n, b.

n GM's between two numbers:

If G_1, G_2 be two GM's between a and b, then

Product of n GM's between a and b:

Assuming Numbers in GP