Nishant Jindal

Khushiyan hi Khushiyan!!

RK :- If a, b, c in AP

$b-a = c-b$

$\boxed{2b = a+c}$

Q For $x \in R$, $3^{1+x}+3^{1-x}$, $\frac{a}{2}$, 9^x+9^{-x} forms an AP then a must lie in Interval?

$3^{1+x}+3^{1-x}$, $\frac{a}{2}$, 9^x+9^{-x} AP

$2\left(\frac{a}{2}\right) = \left(3^{1+x}+3^{1-x}\right)+\left(9^x+9^{-x}\right)$

$a = \left(3 \cdot 3^x + 3 \cdot 3^{-x}\right) + \left(9^x+9^{-x}\right)$

$= 3\left(3^x+\frac{1}{3^x}\right)+\left(9^x+\frac{1}{9^x}\right)$

$\geq 2 \times 3 \qquad \geq 2$

$\geq 6 + \geq 2$

$a \geq 8$

$a \in [8, \infty)$

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Q If p^{th} term of an AP is q & q^{th} term of an AP is p then. find its $(p+q)^{th}$ term?

$\longrightarrow T_{p+q} = ?$

$\longrightarrow T_p = q \Rightarrow a+(p-1)d = q$

$\longrightarrow T_q = p \Rightarrow \cancel{a}+(q-1)d = p$

$d(p-\cancel{1}-q+\cancel{1}) = q-p$

$d(\cancel{p-q}) = (\cancel{q-p})-1$

$\boxed{d=-1}$

$a+(p-1)(-1) = q \Rightarrow a-p+1 = q$

$a = q+p-1$

Concept

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

Demand $= T_{p+q} = a+(p+q-1)d$

$= (\cancel{p+q-1}) -1(\cancel{p+q-1})$

$= 0$

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Q If p^{th} term of an AP is $\frac{1}{q}$ & q^{th} term of an AP is $\frac{1}{p}$ find $(a-d)=?$

$T_p = \frac{1}{q}$, $T_q = \frac{1}{p}$ (given)

$a+(p-1)d = \frac{1}{q}$

$a+(q-1)d = \frac{1}{p}$

$d(p-\cancel{1}-q+\cancel{1}) = \frac{1}{q}-\frac{1}{p}$

$d(\cancel{p-q}) = \frac{(\cancel{p-q})}{pq} \Rightarrow \boxed{d = \frac{1}{pq}}$

$a+(p-1)\frac{1}{pq} = \frac{1}{q}$

$a = \frac{1}{q} - \frac{(p-1)}{pq}$

$a = \frac{\cancel{p}-\cancel{p}+1}{pq} = \frac{1}{pq}$

$\boxed{a = \frac{1}{pq}}$

dem and $= a-d$

$= \frac{1}{pq} - \frac{1}{pq}$

$= 0$

Q If p^{th}, q^{th}, r^{th} Term of an AP is a, b, c then $a(q-r)+b(r-p)+c(q-p)=?$

$p-q$

$T_p = A+(p-1)D = a$ ①

$T_q = A+(q-1)D = b$ ②

$T_r = A+(r-1)D = c$ ③

②-③ $D(q-r) = b-c$

$(q-r) = \frac{b-c}{D}$

③-① $(r-p)D = c-a$

$r-p = \frac{c-a}{D}$

①-② $(p-q)D = a-b$

$(p-q) = \frac{a-b}{D}$

Demand $= a\frac{(b-c)}{D} + b\frac{(c-a)}{D} + c\frac{(a-b)}{D} = \frac{1}{D}(ab-ac+bc-ab+ac-bc) = 0$

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Q If $7-4n$ is Gen. term of AP then Com. difference = ? → $d = ?$

Gen. Term = n^{th} term = $T_n = 7-4n$

$d = T_2 - T_1$

$= (7-4\times 2) - (7-4\times 1)$

$= -8+4 = -4$

Concept :- 1) T_n of an AP is always a linear fxn of n

2) $T_n = a+bn$ ③ Coff of $n = d$

15 sec

Q If $x+1, 3x, 4x+2$ are 3 consecutive terms of an AP find its 5^{th} term?

$a, b, c \to 2b = a+c$

$x+1, 3x, 4x+2$ AP.

$2\times 3x = (4x+2) + (x+1)$

$6x = 5x+3$

$\boxed{x=3}$

$\therefore$ AP → $3+1, 3\times 3, 4\times 3+2$

$4, 9, 14 \to$ AP

$\therefore a=4, d=5$

$T_5 = a+4d = 4+4\times 5$

$= 24$

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Q If a, b, c, d, e are in AP then

$a - 4b + 6c - 3d = ?$

A) $e \cancel{+} a$ B) $d - e$ C) $e \cancel{+} d$ d) $\cancel{0}$

1) If a, b, c, d, e AP.

then $b - a = c - b = d - c = e - d = K$

2) Demand $= a - 4b + 6c - 3d$

$= a - b - 3b + 3c + 3c - 3d$

$= (a-b) - 3(b-c) + 3(c-d)$

$= -K + \cancel{3K} - \cancel{3K} = -K = d - e$

Qs on Common AP.

Q Given 2 AP A: 17, 21, 25, 29 . . . 217

& B: 16, 21, 26 . . . . 266 find No of

com. terms of both APs.

1) A: 17, 21, 25, 29, 33 . . . 217 → $d_1 = 4$

B: 16, 21, 26, 31, 36 . . . 266 → $d_2 = 5$

2) $LCM(d_1, d_2) = LCM(4,5) = 20$ = Nyi AP का d

3) Nyi AP: 21, 41, 61, 81 . . . $\boxed{217}$ मान लिया

(4) No of terms: $\boxed{n = \frac{l-a}{d} + 1}$

$n = \left[\frac{217-21}{20}\right] + 1 = \left[\frac{196}{20}\right] + 1 = [9.8] + 1$

$= 9 + 1 = 10$

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Q How many Integers lie between 81 & 1000 which are divisible by 3?

$84, 87, 90, 93 \dots\dots 999$

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

$$= \frac{999-84}{3} + 1$$

$$= 305 + 1$$

$$= 306$$

Q How many $\boxed{\text{Even Integers}}$ lie betn 81 & 1000 divisible by 5.

$85, 90, 100, 110 \dots\dots 990$

$$n = \frac{990-90}{10} + 1$$

$$n = 91$$

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Q How many 2 digits No. are there Which leaves Remainder 1, when divided by 4.

$$4\overline{)13}(3$$
$$\frac{12}{1}$$

13, 17, 21, 25 - - - 97

$$n = \frac{97-13}{4} + 1 \qquad \left[\frac{99-13}{4}\right]+1$$

$$= 21 + 1$$

$$= 22$$

Q For given Seq^n.

$20, 19\frac{1}{3}, 18\frac{2}{3}, 18 \; \cdots \; 17\frac{1}{3}$ find 1^st Neg. term?

$-\frac{2}{3} \quad -\frac{2}{3} \quad -\frac{2}{3}$

$20, 19\frac{1}{3}, 18\frac{2}{3}, 18, 17\frac{1}{3}, 16\frac{2}{3}, 16$

let n^{th} term is -ve term

$$\Rightarrow t_n < 0$$

$$\Rightarrow 20 + (n-1)\left(-\frac{2}{3}\right) < 0$$

$$\Rightarrow 60 - 2n + 2 < 0$$

$$\Rightarrow 62 < 2n \Rightarrow \boxed{n > 31}$$

$\Rightarrow n = 32^{nd}$ term $=$ -ve

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n^{th} term from End

$a, a+d, a+2d, a+3d \ldots \ldots \; l-3d, l-2d, l-d, l$

$T_4 \quad T_3 \quad T_2 \quad T_1$

4^{th} term from End $= l-3d$

$$\boxed{n^{th} \text{ term from End} = l-(n-1)d}$$

Sum of n terms of AP

$S = a + (a+d) + (a+2d) + \ldots + (a+(n-1)d)$

$S = a+(n-1)d + (a+(n-2)d) + (a+(n-3)d) \ldots a$

$2a+(n-1)d + 2a+d(1+n-2) + 2a+d(2+n-3) + \ldots - 2a+(n-1)d$

$\Rightarrow 2S = n \times (2a+(n-1)d)$

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

$$\boxed{\begin{array}{l} ① \; S_n = \frac{n}{2}[2a+(n-1)d] \\ ② \; S_n = \frac{n}{2}[a+l] \end{array}}$$

$S_n = an + \frac{n^2}{2}d - \frac{nd}{2}$

$= An^2 + n(a - \frac{d}{2})$

3) $\boxed{S_n = An^2 + Bn}$ always in Quad. Expression.

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Q $3+6+9+12---$ Sum upto 50 terms?

$a=3, d=3, n=50$

$S_{50}=\frac{50}{2}[2\times3+(50-1)3]$

$=25[6+150-3]$

$=25\times153$

Q First term of an AP of Consecutive Integers is P^2+1, find Sum of $(2P+1)$ terms of series?

$a=P^2+1, \quad n=(2P+1) \quad d=1$

$S_n=\frac{2P+1}{\cancel{2}}[\cancel{2}(P^2+1)+(\cancel{2}P+\cancel{1}-\cancel{1})\times1]$

$=(2P+1)(P^2+P+1)$

Prilepko → Q9