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X C ROLL No. 10

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Math MTRV - 2

1. Let first term = a and common difference = 'd'

$a_1 = \frac{1}{2} \Rightarrow a = \frac{1}{2}$ - (i)

$a_8 = \frac{17}{6} \Rightarrow a + 7d = \frac{17}{6}$ - (ii)

(ii) - (i)

$a + 7d - a = \frac{17}{6} - \frac{1}{2}$

$\Rightarrow 7d = \frac{28}{12} \Rightarrow d = \frac{1}{3}$

$\therefore$ common difference $= \frac{1}{3}$

Fourth Term $\Rightarrow a_4 = a + 3d$

$= \frac{1}{2} + 3 \times \frac{1}{3}$

$= \frac{1}{2} + 1$

$= \frac{3}{2}$.

$\therefore$ common difference $= \frac{1}{3}$ and $a_4 = \frac{3}{2}$

2. a $a = 11$

common difference $= -3$

$\therefore$ let n^{th} term $= -150$

$\therefore a + (n-1)d = -150$

$11 + (n-1)(-3) = -150$

$11 - 3n + 3 = -150$

$\therefore -3n + 14 = -150$

$\therefore -3n = -164$

$\therefore 3n = 164$

$\therefore$ as n is a fraction here, -150 is not a term of this AP

3. $S_7 = 119$ $\left[S_n = \frac{n}{2}(2a + (n-1)d)\right]$

$\frac{7}{2}(2a + 6d) = 119 \Rightarrow a + 3d = 17 \quad -(i)$

We know, $S_{17} = 714$

$\therefore \frac{17}{2}(2a + 16d) = 714$

$a + 8d = 402 \quad -(ii)$

Subtracting (i) from (ii)

$42 - 17 = a + 3d - a - 8d$

$\Rightarrow 25 = -5d$

$\Rightarrow d = -5$

putting $d = -5$ in (i)

$17 = a + 3(-5)$

$\Rightarrow 17 = a - 15$

$\Rightarrow 15 + 15 = a$

$\Rightarrow a = 32 \; ; \; d = -5$

$$S_n = \frac{n}{2}\left(2 \cdot 32 + (n-1)(-5)\right)$$

$$\Rightarrow S_n = \frac{n}{2}\left(64 - 5n + 5\right)$$

$$\therefore S_n = \frac{69n}{2} - \frac{5n^2}{2}$$

$$\therefore S_n = \frac{69n - 5n^2}{2} \quad \text{and} \quad a = 30 \; ; \; d = -5.$$