



Exercise 11C

Question 16:

All 3 digit numbers which are divisible by 13 are 104, 117, 130, 143, ... 988

This is an AP in which $a = 104$, $d = 117 - 104 = 13$ and $l = 988$

Let the number of these term be n , then

$$T_n = 988 \Rightarrow a + (n - 1)d = 988$$

$$\Rightarrow 104 + (n - 1)13 = 988$$

$$\Rightarrow (n - 1)13 = 884$$

$$\Rightarrow (n - 1) = 68 \Rightarrow n = 69$$

$$\text{Required sum} = \frac{n}{2}(a + l)$$

$$= \frac{69}{2}(104 + 988) = 69 \times 546 = 37674$$

Question 17:

Let a be the first term and d be the common difference of the given AP, then

$$T_2 = 2 \text{ and } T_4 = 8$$

$$\Rightarrow a + (2 - 1)d = 2 \text{ and } a + (4 - 1)d = 8$$

$$a + d = 2 \quad \text{-----(1)}$$

$$a + 3d = 8 \quad \text{-----(2)}$$

On subtracting (1) from (2), we get

$$2d = 6$$

$$d = 3$$

substituting $d = 3$ in (1)

$$a + 3 = 2$$

$$a = -1$$

$$\therefore a = -1, d = 3, n = 51$$

$$\text{Sum of first 51 terms} = \frac{n}{2}[2a + (n - 1)d] \text{ where } n = 51$$

$$= \frac{51}{2}[2 \times (-1) + (51 - 1) \times 3]$$

$$= \frac{51}{2}(-2 + 150) = 51 \times 74 = 3774$$

Question 18:

Let a and d be the first term and common difference of an AP respectively.

$$n = 20$$

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

$$T_5 = a + (5 - 1)d = a + 4d = -4 \dots (1)$$

$$T_{12} = a + (12 - 1)d = a + 11d = -18 \dots (2)$$

Subtracting (1) from (2)

$$7d = -18 + 4 = -14 \therefore d = -2$$

$$\text{from (1), } a + 4 \times (-2) = -4$$

$$\therefore a = 8 - 4 = 4$$

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

$$\begin{aligned} \therefore S_{20} &= \frac{20}{2} [2 \times 4 + (20 - 1) \times (-2)] \\ &= 10(8 - 38) = -300 \end{aligned}$$

Question 19:

Here $a = 21$, $d = (18 - 21) = -3$

Let the required number of terms be n , then

$$S_n = 0 \Rightarrow \frac{n}{2} [2a + (n - 1)d] = 0$$

$$\Rightarrow \frac{n}{2} [2 \times 21 + (n - 1)(-3)] = 0$$

$$\Rightarrow \frac{n}{2} (45 - 3n) = 0$$

$$\Rightarrow n(45 - 3n) = 0$$

$$\Rightarrow 45 - 3n = 0 \Rightarrow 3n = 45$$

$$\Rightarrow n = 15$$

sum of first 15 terms = 0

Question 20:

Here $a = 63$, $d = 60 - 63 = -3$

Let the sum of n terms be 693, then

$$S_n = 693 \Rightarrow \frac{n}{2}[2a + (n-1)d] = 693$$

$$\Rightarrow \frac{n}{2}[2 \times 63 + (n-1)(-3)] = 693$$

$$\Rightarrow n[126 - 3n + 3] = 1386$$

$$\Rightarrow 126n - 3n^2 + 3n = 1386$$

$$\Rightarrow 129n - 3n^2 = 1386$$

$$\Rightarrow 3n^2 - 129n + 1386 = 0$$

$$\Rightarrow n^2 - 43n + 462 = 0$$

$$\Rightarrow n^2 - 22n - 21n + 462 = 0$$

$$\Rightarrow n(n-22) - 21(n-22) = 0$$

$$\Rightarrow (n-22)(n-21) = 0$$

$$\Rightarrow n = 22 \text{ or } n = 21$$

sum of first 22 terms = sum of first 21 terms = 693

\therefore This means that 22nd term is zero

$$T_{22} = 0$$

***** END *****