



### Exercise 11C

Question 26:

It is given that

$$S_n = \left( \frac{5n^2}{2} + \frac{3n}{2} \right)$$

Now, 20<sup>th</sup> term

=(sum of first 20 term) - (sum of first 19 terms)

Putting = 20 in (1) we get

$$\begin{aligned} S_{20} &= \left[ \frac{5 \times (20)^2}{2} + \frac{3 \times 20}{2} \right] = [1000 + 30] \\ &= 1030 \end{aligned}$$

Putting n = 19 in (1), we get

$$\begin{aligned} S_{19} &= \left[ \frac{5 \times (19)^2}{2} + \frac{3 \times 19}{2} \right] = \left[ \frac{5 \times 19 \times 19}{2} + \frac{57}{2} \right] \\ &= \left[ \frac{1805}{2} + \frac{57}{2} \right] = \left[ \frac{1862}{2} \right] = 931 \end{aligned}$$

$$\therefore T_{20} = (S_{20} - S_{19}) = (1030 - 931) = 99$$

Hence, the 20<sup>th</sup> term is 99

Question 27:

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

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

$$\begin{aligned}\therefore S_7 &= \frac{7}{2} [2a + (7-1)d] \\ &= \frac{7}{2} (2a + 6d) = 7(a + 3d)\end{aligned}$$

$$S_7 = 49$$

$$\therefore 7(a + 3d) = 49 \text{ or } a + 3d = 7 \text{ --- (1)}$$

$$\begin{aligned}S_{17} &= \frac{17}{2} [2a + (17-1)d] \\ &= \frac{17}{2} (2a + 16d) = 17(a + 8d)\end{aligned}$$

$$S_{17} = 289$$

$$17(a + 8d) = 289$$

$$\text{or } a + 8d = 17 \text{ --- (2)}$$

Subtracting (1) from (2)

$$5d = 10$$

$$\Rightarrow d = 2$$

$$\text{from (1), } a + 3 \times 2 = 7, a = 1$$

$$\begin{aligned}S_n &= \frac{n}{2} [2a + (n-1)d] \\ &= \frac{n}{2} [2 \times 1 + (n-1) \times 2] \\ &= \frac{n}{2} [2 + (n-1)2] = \frac{n}{2} \times 2n = n^2\end{aligned}$$

Question 28:

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

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

$$\therefore S_9 = \frac{9}{2} (2a + 8d) \text{ and } S_{20} = \frac{20}{2} (2a + 19d)$$

$$\text{But, } S_9 = 81 \text{ and } S_{20} = 400$$

$$\therefore \frac{9}{2} (2a + 8d) = 81 \Rightarrow a + 4d = 9 \text{ --- (1)}$$

$$\text{and } \frac{20}{2} (2a + 19d) = 400 \Rightarrow 2a + 19d = 40 \text{ --- (2)}$$

Multiplying (1) by 2 and subtracting the result from (2), we get

$$\therefore 11d = 22 \Rightarrow d = 2$$

Putting d = 2 in (1), we get a + 8 = 9 a = 1

Thus, a = 1, d = 2

Question 29:

First term a = 4

Last term  $l = 81$

Common difference  $= 7$

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

$$81 = 4 + (n - 1)7$$

$$\therefore 7(n - 1) = 81 - 4 = 77$$

$$\text{or } n - 1 = 11 \quad \therefore n = 12$$

$$\text{Here } a = 4, n = 12, l = 81$$

$$\begin{aligned} S_n &= \frac{n}{2}(a + l) = \frac{12}{2}(4 + 81) \\ &= 6 \times 85 = 510 \end{aligned}$$

Question 30:

First term of an AP,  $a = 22$

Last term  $= n^{\text{th}}$  term  $= -11$

$$\text{Sum of } n \text{ terms} = S_n = \frac{n}{2}(a + l) = 66$$

$$\Rightarrow \frac{n}{2}(22 - 11) = 66 \quad \text{or} \quad \frac{n}{2} \times 11 = 66$$

$$\therefore n = \frac{66 \times 2}{11} = 12$$

$$n^{\text{th}} \text{ term} = l = a + (n - 1)d$$

$$\therefore -11 = 22 + (12 - 1) \times d \quad \text{or} \quad -11 = 22 + 11d$$

$$\Rightarrow 11d = -22 - 11$$

$$\Rightarrow 11d = -33$$

$$\therefore d = \frac{-33}{11} = -3$$

Thus,  $n = 12, d = -3$

\*\*\*\*\* END \*\*\*\*\*