Exercise 11C

Question 26:
It is given that

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

Now, 20th term
=(sum of first 20 term) - (sum of first 19 terms)
Putting = 20 in (1) we get

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

$$= 1030$$

Putting n = 19 in (1), we get

$$S_{19} = \left[\frac{5\times(19)^2}{2} + \frac{3\times 19}{2}\right] = \left[\frac{5\times 19\times 19}{2} + \frac{57}{2}\right]$$

$$= \left[\frac{1805}{2} + \frac{57}{2}\right] = \left[\frac{1862}{2}\right] = 931$$

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

Hence, the 20th term is 99

Question 27:
Let a be the first term and d be the common difference of the AP

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

$$\therefore S_7 = \frac{7}{2}[2a+(7-1)d]$$

$$= \frac{7}{2}(2a+6d) = 7(a+3d)$$

$$S_7 = 49$$

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

$$S_{17} = \frac{17}{2}[2a+(17-1)d]$$

$$= \frac{17}{2}(2a+16d) = 17(a+8d)$$

$$S_{17} = 289$$

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

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

$$\text{Subtracting } (1) \text{from } (2)$$

$$5d = 10$$

$$\Rightarrow d = 2$$

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

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

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

$$= \frac{n}{2}[2+(n-1)2] = \frac{n}{2}\times 2n = n^2$$

Question 28:
Let a be the first term and d be the common difference of the given AP, then we get

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

$$\therefore \quad S_9 = \frac{9}{2}(2a+8d) \text{ and } S_{20} = \frac{20}{1}(2a+19d)$$

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

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

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

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

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

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

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

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

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

$$S_n = \frac{n}{2}(a+l) = \frac{12}{2}(4+81)$$

$$= 6 \times 85 = 510$$

Question 30:
First term of an AP, a = 22
Last term = n^{th} term = - 11

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

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

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

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

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

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

$$\Rightarrow 11d = -33$$

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

Thus, n = 12, d = -3

********** END **********