



Arithmetic Progressions Ex 19.4 Q12

In the given series $3 + 5 + 7 + 9 + \dots$ to $3n$

Here,

$$a = 3$$

$$d = 2$$

$$\text{Number of terms } s = 3n$$

The sum of n term is

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

$$\begin{aligned} \Rightarrow S_{3n} &= \frac{3n}{2} [6 + (3n-1)2] \\ &= 3n(2n+3) \end{aligned}$$

Arithmetic Progressions Ex 19.4 Q13

The first number between 100 and 800 which on division by 16 leaves the remainder 7 is 112 and last number is 791.

Thus, the series so formed is 103, 119, ..., 791

Let number of terms be n , then

$$n\text{th term} = 791$$

Then,

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

$$\Rightarrow 791 = 103 + (n-1)16$$

$$\Rightarrow n = 44$$

Then, sum of all terms of the given series is

$$\begin{aligned} S_{44} &= \frac{44}{2} [103 + 791] \\ &= \frac{44 \times 894}{2} \\ &= 19668 \end{aligned}$$

Arithmetic Progressions Ex 19.4 Q14

$$(i) \quad 25 + 22 + 19 + 16 + \dots + x = 115$$

Here, sum of the given series of say n terms is 115

So, the n th term = x

Here, $a = 25$ and $d = 22 - 25 = -3$

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

$$\Rightarrow x = 25 - 3(n - 1)$$

$$\Rightarrow x = 28 - 3n \quad \text{--- (i)}$$

The sum of n terms

$$S_n = \frac{n}{2}[a + l]$$

$$\Rightarrow 115 = \frac{n}{2}[25 + 28 - 3n]$$

$$\Rightarrow 230 = 53n - 3n^2$$

$$\Rightarrow 3n^2 - 53n - 230 = 0$$

$$\Rightarrow 3n^2 - 30n - 23n - 230 = 0$$

$$\Rightarrow n = 10 \text{ or } \frac{23}{3}$$

But n can't be fraction

$$\therefore n = 10 \quad \text{--- (ii)}$$

From (i) and (ii)

$$x = 28 - 3n$$

$$= 28 - 3(10)$$

$$= -2$$

$$x = -2$$

$$(ii) \quad 1 + 4 + 7 + 10 + \dots + x = 590$$

Here, $a = 1$

$$d = 4 - 1 = 3$$

Let there be n terms so the n th term = x

$$\Rightarrow x = 1 + (n - 1)3 \quad [\because a_n = a + (n - 1)d]$$

$$\Rightarrow x = 3n - 2 \quad \text{--- (i)}$$

and

$$S_n = 590 \quad [\text{Given}]$$

$$\Rightarrow \frac{n}{2}[a + l] = 590$$

$$\Rightarrow \frac{n}{2}[1 + 3n - 2] = 590 \quad [\because l = x = 3n - 2]$$

$$\Rightarrow 3n^2 - n - 1080 = 0$$

$$\Rightarrow 3n^2 - 60n + 59n - 1080 = 0$$

$$\Rightarrow 3n(n - 20) + 59(n - 20) = 0$$

$$\Rightarrow n = 20 \quad \text{--- (ii)}$$

From (i) and (ii)

$$x = 3n - 2$$

$$= 3(20) - 2$$

$$= 58$$

$$x = 58$$

*****END*****