Arithematic Progressions Ex 19.4 Q12

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

Here,

$$a = 3$$

$$d = 2$$

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

The sum of n term is

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

$$\Rightarrow \quad S_{3n} = \frac{3n}{2}\left[6+(3n-1)2\right]$$

$$= 3n\left(2n+3\right)$$

Arithematic 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 $103, 119, \ldots, 791$

Let number of terms be n, then

nth term = 791

Then,

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

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

$\Rightarrow \quad n = 44$

Then, sum of all terms of the given series is

$$S_{43} = \frac{44}{2}[103+791]$$

$$= \frac{44\times 894}{2}$$

$$= 19668$$

Arithematic Progressions Ex 19.4 Q14

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

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

So, the nth term $= x$

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

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

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

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

The sum of n terms

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

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

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

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

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

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

But n can't be function

$\therefore \quad n = 10$ ---(ii)

From (i) and (ii)

$x = 28-3n$

$= 28-3(10)$

$= -2$

$x = -2$

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

Here, $a = 1$

$d = 4-1 = 3$

Let there be n terms so the nth term $= x$

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

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

and

$S_n = 590$ [Given]

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

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

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

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

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

$\Rightarrow \quad n = 20$ ---(ii)

From (i) and (ii)

$x = 3n-2$

$= 3(20)-2$

$= 58$

$x = 58$

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