Arithematic Progressions Ex 19.4 Q19

Given,

$a = 2$

$l = 50$

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

$50 = 2 + (n-1)d$

$(n-1)d = 48 \quad \text{---(i)}$

S_n of all n terms is given 442

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

$442 = \frac{n}{2}[2 + 50]$

or $\quad n = 17 \quad \text{---(ii)}$

From (i) and (ii)

$$d = \frac{48}{n-1} = \frac{48}{16} = 3$$

The common difference is 3.

Arithematic Progressions Ex 19.4 Q20

Let no. of terms be 2n

Odd terms sum=24=$T_1+T_3+...+T_{2n-1}$

Even terms sum=30=$T_2+T_4+...+T_{2n}$

Subtract above two equations

nd=6

$$T_{2n} = T_1 + \frac{21}{2}$$

$$T_{2n} - a = \frac{21}{2}$$

$$(2n-1)d = \frac{21}{2}$$

$$12 - \frac{21}{2} = d = \frac{3}{2}$$

$$\Rightarrow n = 6 \times \frac{2}{3} = 4$$

$$Total\ terms = 2n = 8$$

Subtitute above values in equation of sum of even terms or odd terms, we get

$$a = \frac{3}{2}$$

So series is $\frac{3}{2}, 3, \frac{9}{2}.....$

Arithematic Progressions Ex 19.4 Q21

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

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

$$n^2 p = \frac{n}{2}\left(2a+(n-1)d\right)$$

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

$$2np = 2a+(n-1)d \qquad \text{.....(1)}$$

Again

$$S_m = \frac{m}{2}\left(2a+(m-1)d\right)$$

$$m^2 p = \frac{m}{2}\left(2a+(m-1)d\right)$$

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

$$2mp = 2a+(m-1)d \qquad \text{.....(2)}$$

Now subtract (1) from (2)

$$2p(m-n) = (m-n)d$$

$$d = 2p$$

Therefore

$$2mp = 2a+(m-1)\cdot 2p$$

$$2a = 2p$$

$$a = p$$

The sum up to p terms will be:

$$S_p = \frac{p}{2}\left(2a+(p-1)d\right)$$

$$= \frac{p}{2}\left(2p+(p-1)\cdot 2p\right)$$

$$= \frac{p}{2}\left(2p+2p^2-2p\right)$$

$$= p^3$$

Hence it is shown.

Arithematic Progressions Ex 19.4 Q22

$a_{12} = a+11d = -13$ ---(i) [Given]

$s_4 = \frac{4}{2}(2a+3d) = 24$ ---(ii) [Given]

From (i) and (ii)

$d = -2$ and $a = 9$

Then,

Sum of irst 10 terms is

$S_{10} = \frac{10}{2}[2\times 9+(9)(-2)]$ $\left[\text{Using } S_n = \frac{n}{2}[2a+(n-1)d]\right]$

$= 0$

Sum of first 10 terms is zero.

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