Arithematic Progressions Ex 19.2 Q11

Given:

$$a_{10} = 41 = a + 9d \quad \text{---(i)}$$

$$a_{18} = 73 = a + 17d \quad \text{---(ii)}$$

Solving (i) and (ii)

$$a + 9d = 41$$

$$a + 17d = 73$$

We get $a = 5$ and $d = 4$

$$\therefore \quad a_{26} = a + (26 - 1)d$$

$$= 5 + 25(4)$$

$$= 105$$

26th term of the given A.P is 105.

Arithematic Progressions Ex 19.2 Q12

Given:

$$a_{24} = 2a_{10}$$

$$\Rightarrow \quad a + 23d = 2(a + 9d)$$

$$\Rightarrow \quad a = 5d \quad \text{---(i)}$$

$$a_{72} = a + (72 - 1)d$$

$$= a + 71d \quad [\because a = 5d \text{ from (i)}]$$

$$\Rightarrow \quad = 76d \quad \text{---(ii)}$$

$$a_{34} = a + (34 - 1)d$$

$$= 5d + 33d \quad [\because a = 5d \text{ from (i)}]$$

$$= 38d \quad \text{---(iii)}$$

From (ii) and (iii)

$$a_{72} = 2a_{34}$$ Hence proved.

Arithematic Progressions Ex 19.2 Q13

Given:

$$a_{m+1} = 2a_{n+1}$$

$$\Rightarrow \quad a + (m+1-1)d = 2\left(a + (n+1-1)d\right)$$

$$\Rightarrow \quad a + md = 2a + 2nd$$

$$\Rightarrow \quad a = (m-2n)d \qquad \text{---(i)}$$

Then,

$$a_{3m+1} = a + (3m+1-1)d$$

$$= a + 3md$$

$$= 3d - 2nd + 3md$$

$$= 2(2m-n)d \qquad \text{---(ii)}$$

$$a_{m+n+1} = a + (m+n+1-1)d$$

$$= md - 2nd + md + nd$$

$$= (2m-n)d \qquad \text{---(iii)}$$

From (ii) and (iii)

$a_{2m+1} = 2a_{m+n+1}$ Hence proved.

Arithematic Progressions Ex 19.2 Q14

The given A.P is $9, 7, 5, \ldots$ and $15, 12, 9$

Here,

$a = 9 \qquad A = 15$

$d = -2 \qquad D = 3$

Let $a_n = A_n$ for same n.

$$\Rightarrow \quad a + (n-1)d = A + (n-1)d$$

$$\Rightarrow \quad 9 + (n-1)(-2) = 15 + (n-1)3$$

$$\Rightarrow \quad n = 7$$

$\therefore$ 7th term of both the A.P is same.

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