Arithematic Progressions Ex 19.2 Q11

Given:

$$a_{10} = 41 = a + 9d \qquad\qquad ---(i)$$
$$a_{18} = 73 = a + 17d \qquad\qquad ---(ii)$$

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:

$$a_{24} = 2a_{10}$$
$$\Rightarrow \quad a + 23d = 2(a + 9d)$$
$$\Rightarrow \quad a = 5d \qquad\qquad ---(i)$$

$$a_{72} = a + (72 - 1)d$$
$$= a + 71d \qquad\qquad \left[\because a = 5d \text{ from } (i)\right]$$
$$\Rightarrow \quad = 76d \qquad\qquad ---(ii)$$
$$a_{34} = a + (34 - 1)d$$
$$= 5d + 33d \qquad\qquad \left[\because a = 5d \text{ from } (i)\right]$$
$$= 38d \qquad\qquad ---(iii)$$

From (ii) and (iii)

$$a_{72} = 2a_{34} \qquad \text{Hence proved.}$$

Arithematic Progressions Ex 19.2 Q13

Given:

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

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

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

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

Then,

$\begin{aligned} a_{3m+1} &= a + (3m + 1 - 1)d \\ &= a + 3md \\ &= 3d - 2nd + 3md \\ &= 2(2m - n)d \qquad\qquad --- (ii) \end{aligned}$

$\begin{aligned} a_{m+n+1} &= a + (m + n + 1 - 1)d \\ &= md - 2nd + md + nd \\ &= (2m - n)d \qquad\qquad --- (iii) \end{aligned}$

From (ii) and (iii)

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

Arithematic Progressions Ex 19.2 Q14

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

Here,

$$a = 9 \qquad\qquad A = 15$$
$$d = -2 \qquad\qquad D = 3$$

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 *********