Arithematic Progressions Ex 19.6 Q7

Let $A_1, A_2, A_3, A_4, \ldots, A_n$ be the n AMs inserted between two number a and b.

Then,

$$a, A_1, A_2, A_3, A_4, \ldots, A_n, b \text{ are in A.P}$$

So, the mean of a and b

$$\text{A.M} = \frac{a+b}{2}$$

The mean of A_1 and A_n

$$\text{A.M} = \frac{a+d+b-d}{2} = \frac{a+b}{2}$$

Similarly mean of A_2 and A_{n-1}

$$\text{A.M} = \frac{a+2d+b-2d}{2} = \frac{a+b}{2}$$

Similarly we observe the means is equidistant from begining and the end is constant $\frac{a+b}{2}$.

The AM is $\frac{a+b}{2}$.

Arithematic Progressions Ex 19.6 Q8

Here,

A_1 is the A.M of x and y,

and A_2 is the A.M of y and z.

Then,

$$A_1 = \frac{x+y}{2} \quad \text{---(i)} \qquad \left[\because \text{AM} = \frac{a+b}{2}\right]$$

$$A_2 = \frac{y+z}{2} \quad \text{---(ii)}$$

Let A.M be the arithematic mean of A_1 and A_2

Then,

$$\text{A.M} = \frac{A_1 + A_2}{4}$$

$$= \frac{x+y+y+z}{4}$$

$$= \frac{x+2y+z}{4} \quad \text{---(iii)}$$

Since, $4, y, z$ are in A.P [Given]

$$y = \frac{x+a}{2} \quad \text{---(iv)}$$

From (iii) and (iv)

$$\text{A.M} = \frac{\left(\frac{x+a}{2}\right) + \left(\frac{2y}{2}\right)}{2} = \frac{y+y}{2} = y$$

Hence, proved A.M between A_1 and A_2 is y.

Arithematic Progressions Ex 19.6 Q9

$$8, a_1, a_2, a_3, a_4, a_5, 26$$

$$a = 8$$

$$a + 6d = 26$$

$$\Rightarrow d = \frac{18}{6} = 3$$

So series is 8, 11, 14, 17, 20, 23, 26

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