



Arithmetic Progressions Ex 9.2 Q8

Answer :

In the given problem, we are given the sequence with the n^{th} term (a_n) as $a + nb$ where a and b are real numbers.

We need to show that this sequence is an A.P and then find its common difference (d)

Here,

$$a_n = a + nb$$

Now, to show that it is an A.P, we will find its few terms by substituting $n = 1, 2, 3$

So,

Substituting $n = 1$, we get

$$a_1 = a + (1)b$$

$$a_1 = a + b$$

Substituting $n = 2$, we get

$$a_2 = a + (2)b$$

$$a_2 = a + 2b$$

Substituting $n = 3$, we get

$$a_3 = a + (3)b$$

$$a_3 = a + 3b$$

Further, for the given sequence to be an A.P,

$$\text{Common difference } (d) = a_2 - a_1 = a_3 - a_2$$

Here,

$$\begin{aligned} a_2 - a_1 &= a + 2b - a - b \\ &= b \end{aligned}$$

Also,

$$\begin{aligned} a_3 - a_2 &= a + 3b - a - 2b \\ &= b \end{aligned}$$

Since $a_2 - a_1 = a_3 - a_2$

Hence, the given sequence is an A.P and its common difference is $d = b$.

Arithmetic Progressions Ex 9.2 Q9

Answer :

In the given problem, we are given the sequence with the n^{th} term (a_n).

We need to show that these sequences form an A.P

$$(i) a_n = 3 + 4n$$

Now, to show that it is an A.P, we will first find its few terms by substituting $n = 1, 2, 3$

So,

Substituting $n = 1$, we get

$$a_1 = 3 + 4(1)$$

$$a_1 = 7$$

Substituting $n = 2$, we get

$$a_2 = 3 + 4(2)$$

$$a_2 = 11$$

Substituting $n = 3$, we get

$$a_3 = 3 + 4(3)$$

$$a_3 = 15$$

Further, for the given sequence to be an A.P,

$$\text{Common difference } (d) = a_2 - a_1 = a_3 - a_2$$

Here,

$$\begin{aligned} a_2 - a_1 &= 11 - 7 \\ &= 4 \end{aligned}$$

Also,

$$a_3 - a_2 = 15 - 11$$

$$= 4$$

Since $a_2 - a_1 = a_3 - a_2$

Hence, the given sequence is an A.P

(ii) $a_n = 5 + 2n$

Now, to show that it is an A.P, we will find its few terms by substituting $n = 1, 2, 3$

So,

Substituting $n = 1$, we get

$$a_1 = 5 + 2(1)$$

$$a_1 = 7$$

Substituting $n = 2$, we get

$$a_2 = 5 + 2(2)$$

$$a_2 = 9$$

Substituting $n = 3$, we get

$$a_3 = 5 + 2(3)$$

$$a_3 = 11$$

Further, for the given sequence to be an A.P,

Common difference (d) = $a_2 - a_1 = a_3 - a_2$

Here,

$$a_2 - a_1 = 9 - 7$$

$$= 2$$

Also,

$$a_3 - a_2 = 11 - 9$$

$$= 2$$

Since $a_2 - a_1 = a_3 - a_2$

Hence, the given sequence is an A.P

(iii) $a_n = 6 - n$

Now, to show that it is an A.P, we will find its few terms by substituting $n = 1, 2, 3$

So,

Substituting $n = 1$, we get

$$a_1 = 6 - 1$$

$$a_1 = 5$$

Substituting $n = 2$, we get

$$a_2 = 6 - 2$$

$$a_2 = 4$$

Substituting $n = 3$, we get

$$a_3 = 6 - 3$$

$$a_3 = 3$$

Further, for the given sequence to be an A.P,

Common difference (d) = $a_2 - a_1 = a_3 - a_2$

Here,

$$a_2 - a_1 = 4 - 5$$

$$= -1$$

Also,

$$a_3 - a_2 = 3 - 4$$

$$= -1$$

Since $a_2 - a_1 = a_3 - a_2$

Hence, the given sequence is an A.P

$$(iv) a_n = 9 - 5n$$

Now, to show that it is an A.P, we will find its few terms by substituting $n = 1, 2, 3$

So,

Substituting $n = 1$, we get

$$a_1 = 9 - 5(1)$$

$$a_1 = 4$$

Substituting $n = 2$, we get

$$a_2 = 9 - 5(2)$$

$$a_2 = -1$$

Substituting $n = 3$, we get

$$a_3 = 9 - 5(3)$$

$$a_3 = -6$$

Further, for the given sequence to be an A.P,

Common difference (d) = $a_2 - a_1 = a_3 - a_2$

Here,

$$a_2 - a_1 = -1 - 4$$

$$= -5$$

Also,

$$a_3 - a_2 = -6 - (-1)$$

$$= -5$$

Since $a_2 - a_1 = a_3 - a_2$

Hence, the given sequence is an A.P.

***** END *****