



Arithmetic Progressions Ex 9.5 Q40

Answer :

In the given problem, we have the first and the n th term of an A.P. along with the sum of the n terms of A.P. Here, we need to find the number of terms and the common difference of the A.P.

Here,

The first term of the A.P (a) = 8

The n th term of the A.P (l) = 33

Sum of all the terms $S_n = 123$

Let the common difference of the A.P. be d .

So, let us first find the number of the terms (n) using the formula,

$$123 = \left(\frac{n}{2}\right)(8 + 33)$$

$$123 = \left(\frac{n}{2}\right)(41)$$

$$\frac{(123)(2)}{41} = n$$

$$n = \frac{246}{41}$$

$$n = 6$$

Now, to find the common difference of the A.P. we use the following formula,

$$l = a + (n - 1)d$$

We get,

$$33 = 8 + (6 - 1)d$$

$$33 = 8 + (5)d$$

$$\frac{33 - 8}{5} = d$$

Further, solving for d ,

$$d = \frac{25}{5}$$

$$d = 5$$

Therefore, the number of terms is $n = 6$ and the common difference of the A.P. $d = 5$.

Arithmetic Progressions Ex 9.5 Q41

Answer :

In the given problem, we have the first and the n th term of an A.P. along with the sum of the n terms of A.P. Here, we need to find the number of terms and the common difference of the A.P.

Here,

The first term of the A.P (a) = 22

The n th term of the A.P (l) = -11

Sum of all the terms $S_n = 66$

Let the common difference of the A.P. be d .

So, let us first find the number of the terms (n) using the formula,

$$66 = \left(\frac{n}{2}\right)[22 + (-11)]$$

$$66 = \left(\frac{n}{2}\right)(22 - 11)$$

$$(66)(2) = (n)(11)$$

Further, solving for n

$$n = \frac{(66)(2)}{11}$$

$$n = (6)(2)$$

$$n = 12$$

Now, to find the common difference of the A.P. we use the following formula,

$$l = a + (n-1)d$$

We get,

$$-11 = 22 + (12-1)d$$

$$-11 = 22 + (11)d$$

$$\frac{-11-22}{11} = d$$

Further, solving for d ,

$$d = \frac{-33}{11}$$

$$d = -3$$

Therefore, the number of terms is $n=12$ and the common difference of the A.P. $d=-3$.

Arithmetic Progressions Ex 9.5 Q42

Answer :

In the given problem, the sum of n terms of an A.P. is given by the expression,

$$S_n = 4n - n^2$$

So here, we can find the first term by substituting $n=1$,

$$S_n = 4n - n^2$$

$$S_1 = 4(1) - (1)^2$$

$$= 4 - 1$$

$$= 3$$

Similarly, the sum of first two terms can be given by,

$$S_2 = 4(2) - (2)^2$$

$$= 8 - 4$$

$$= 4$$

Now, as we know,

$$a_n = S_n - S_{n-1}$$

So,

$$a_2 = S_2 - S_1$$

$$= 4 - 3$$

$$= 1$$

Now, using the same method we have to find the third, tenth and n^{th} term of the A.P.

So, for the third term,

$$a_3 = S_3 - S_2$$

$$= [4(3) - (3)^2] - [4(2) - (2)^2]$$

$$= (12 - 9) - (8 - 4)$$

$$= 3 - 4$$

$$= -1$$

Also, for the tenth term,

$$a_{10} = S_{10} - S_9$$

$$= [4(10) - (10)^2] - [4(9) - (9)^2]$$

$$= (40 - 100) - (36 - 81)$$

$$= -60 + 45$$

$$= -15$$

So, for the n^{th} term,

$$a_n = S_n - S_{n-1}$$

$$= [4(n) - (n)^2] - [4(n-1) - (n-1)^2]$$

$$= (4n - n^2) - (4n - 4 - n^2 + 1 + 2n)$$

$$= 4n - n^2 - 4n + 4 + n^2 + 1 - 2n$$

$$= 5 - 2n$$

Therefore, $a=3, S_2=4, a_2=1, a_3=-1, a_{10}=-15$.

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