Arithmetic Progressions Ex 9.5 Q6

Answer :

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

Here,

The first term of the A.P $(a) = 17$

The last term of the A.P $(l) = 350$

The common difference of the A.P. $= 9$

Let the number of terms be n.

So, as we know that,

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

We get,

$$350 = 17 + (n-1)9$$

$$350 = 17 + 9n - 9$$

$$350 = 8 + 9n$$

$$350 - 8 = 9n$$

Further solving this,

$$n = \frac{342}{9}$$

$$n = 38$$

Using the above values in the formula,

$$S_n = \left(\frac{n}{2}\right)(a+l)$$

$$= \left(\frac{38}{2}\right)(17 + 350)$$

$$= (19)(367)$$

$$= 6973$$

Therefore, the number of terms is $\boxed{n = 38}$ and the sum $\boxed{S_n = 6973}$.

Arithmetic Progressions Ex 9.5 Q7

Answer :

In the given problem, let us take the first term as a and the common difference as d.

Here, we are given that,

$$a_3 = 7 \qquad \qquad ......(1)$$

$$a_7 = 3a_3 + 2 \qquad \qquad ......(2)$$

So, using (1) in (2), we get,

$$a_7 = 3(7) + 2$$

$$= 21 + 2$$

$$= 23 \qquad \qquad ......(3)$$

Also, we know,

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

For the 3th term $(n = 3)$,

$$a_3 = a + (3-1)d$$

$$7 = a + 2d \qquad \qquad (\text{Using } 1)$$

$$a = 7 - 2d \qquad \qquad ......(4)$$

Similarly, for the 7th term $(n = 7)$,

$$a_7 = a + (7-1)d$$

$$24 = a + 6d \qquad \qquad (\text{Using } 3)$$

$$a = 24 - 6d \qquad \qquad ......(5)$$

Subtracting (4) from (5), we get,

$$a - a = (23 - 6d) - (7 - 2d)$$
$$0 = 23 - 6d - 7 + 2d$$
$$0 = 16 - 4d$$
$$4d = 16$$
$$d = 4$$

Now, to find a, we substitute the value of d in (4),

$$a = 7 - 2(4)$$
$$a = 7 - 8$$
$$a = -1$$

So, for the given A.P $\boxed{d = 4 \text{ and } a = -1}$

So, to find the sum of first 20 terms of this A.P., we use the following formula for the sum of n terms of an A.P.,

$$S_n = \frac{n}{2}\left[2a + (n-1)d\right]$$

Where; a = first term for the given A.P.

d = common difference of the given A.P.

n = number of terms

So, using the formula for $n = 20$, we get,

$$S_{20} = \frac{20}{2}\left[2(-1) + (20 - 1)(4)\right]$$
$$= (10)\left[-2 + (19)(4)\right]$$
$$= (10)\left[-2 + 76\right]$$
$$= (10)\left[74\right]$$
$$= 740$$

Therefore, the sum of first 20 terms for the given A.P. is $\boxed{S_{20} = 740}$.

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