Arithmetic Progressions Ex 9.5 Q15

Answer :

In this problem, we need to find the sum of all the multiples of 5 lying between 84 and 719.
So, we know that the first multiple of 5 after 84 is 85 and the last multiple of 5 before 719 is 715.
Also, all these terms will form an A.P. with the common difference of 5.
So here,
First term (a) = 85
Last term (l) = 715
Common difference (d) = 5
So, here the first step is to find the total number of terms. Let us take the number of terms as n.
Now, as we know,

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

So, for the last term,

$$715 = 85 + (n-1)5$$
$$715 = 85 + 5n - 5$$
$$715 = 80 + 5n$$
$$715 - 80 = 5n$$

Further simplifying,

$$635 = 5n$$
$$n = \frac{635}{5}$$
$$n = 127$$

Now, using the formula for the sum of n terms,

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

We get,

$$S_n = \frac{127}{2}\left[2(85) + (127-1)5\right]$$
$$= \frac{127}{2}\left[170 + (126)5\right]$$
$$= \frac{127}{2}(170 + 630)$$
$$= \frac{127(800)}{2}$$

On further simplification, we get,

$$S_n = 127(400)$$
$$= 50800$$

Therefore, the sum of all the multiples of 5 lying between 84 and 719 is $\boxed{S_n = 50800}$.

Arithmetic Progressions Ex 9.5 Q16

Answer :

In this problem, we need to find the sum of all the multiples of 7 lying between 50 and 500.
So, we know that the first multiple of 7 after 50 is 56 and the last multiple of 7 before 500 is 497.
Also, all these terms will form an A.P. with the common difference of 7.
So here,
First term (a) = 56
Last term (l) = 497
Common difference (d) = 7
So, here the first step is to find the total number of terms. Let us take the number of terms as n.
Now, as we know,

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

So, for the last term,

$$497 = 56 + (n-1)7$$
$$497 = 56 + 7n - 7$$
$$497 = 49 + 7n$$
$$497 - 49 = 7n$$

Further simplifying,

$$448 = 7n$$
$$n = \frac{448}{7}$$
$$n = 64$$

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

For n = 64, we get,

$$S_n = \frac{64}{2}\left[2(56) + (64-1)7\right]$$
$$= 32\left[112 + (63)7\right]$$
$$= 32(112 + 441)$$
$$= 32(553)$$
$$= 17696$$

Therefore, the sum of all the multiples of 7 lying between 50 and 500 is $\boxed{S_n = 17696}$.

Arithmetic Progressions Ex 9.5 Q17

Answer :

In this problem, we need to find the sum of all the even numbers lying between 101 and 999.
So, we know that the first even number after 101 is 102 and the last even number before 999 is 998.
Also, all these terms will form an A.P. with the common difference of 2.
So here,
First term (a) = 102
Last term (l) = 998
Common difference (d) = 2
So, here the first step is to find the total number of terms. Let us take the number of terms as n.
Now, as we know,

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

So, for the last term,

$$998 = 102 + (n-1)2$$
$$998 = 102 + 2n - 2$$
$$998 = 100 + 2n$$
$$998 - 100 = 2n$$

Further simplifying,

$$898 = 2n$$
$$n = \frac{898}{2}$$
$$n = 449$$

Now, using the formula for the sum of n terms,

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

For $n = 64$, we get,

$$S_n = \frac{449}{2}\left[2(102) + (449-1)2\right]$$
$$= \frac{449}{2}\left[204 + (448)2\right]$$
$$= \frac{449}{2}(204 + 896)$$
$$= \frac{449}{2}(1100)$$

On further simplification, we get,

$$S_n = 449(550)$$
$$= 246950$$

Therefore, the sum of all the even numbers lying between 101 and 999 is $\boxed{S_n = 246950}$.

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