

MATHEMATICS Chapter-5

Arithmetic Progression

EXERCISE 5.3

6) The first and the last terms of an AP are 17 and 350 respectively. If the common difference is 9, how many terms are there and what is their sum?

Soln:- Here $a = 17$ $l = 350$ $d = 9$

We know that

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

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

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

$$333 = (n-1)9$$

$$(n-1)9 = 333$$

$$n - 1 = 333/9$$

$$n - 1 = 37$$

$$n = 38$$

Hence there are 38 terms

Again We know that

$$S_n = \frac{n}{2}[a + l]$$

$$S_{38} = \frac{38}{2}[17 + 350]$$

$$S_{38} = (19)(367)$$

$$S_{38} = 6973$$

Hence their sum is 6973

7) Find the sum of first 22 terms of an AP in which $d = 7$ and 22nd term is 149.

Soln:- Here $a_{22} = 149$ $d = 7$

Let the first term of the AP be a

We know that $a_n = a + (n-1)d$

$$a_{22} = a + (22 - 1)d$$

$$a_{22} = a + 21d$$

$$149 = a + (21)(7)$$

$$a + 147 = 149$$

$$a = 149 - 147$$

$$a = 2$$

Again We know that

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

$$S_{22} = \frac{22}{2}[2(2) + (22-1)7]$$

$$S_{22} = (11)(4 + 147)$$

$$S_{22} = (11)(151)$$

$$S_{22} = 1661$$

Hence the sum of first 22 term of the AP is 1661

8) Find the sum of first 51 terms of an AP whose second and third terms are 14 and 18 respectively.

Soln:- Let the first term and the common difference of the AP be a and d respectively.

Second term = 14 (Given)

$$a + (2-1)d = 14$$

$$a + d = 14 \dots \dots \dots (1)$$

Third term = 18

$$a + (3 - 1) d = 18$$

$$a + 2d = 18 \dots \dots \dots (2)$$

Solving equation (1) and equation (2)

We get

$$a = 10$$

$$d = 4$$

Now, Sum of first n terms

$$S_{51}$$

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

$$S_n = \frac{51}{2}[2 \times a + (51-1)d]$$

$$= \frac{51}{2}[2 \times a + (50d)]$$

$$= 51(a + 25d)$$

$$= (51)(10 + 25 \times 4)$$

$$= (51)(10 + 100)$$

$$= 5610$$

9) If the sum of first 7 terms of an AP is 49 and that of 17 terms is 289, find the sum of first n terms.

Solⁿ:- Let the first term and the common difference of the AP be a and d respectively

Sum of first 7 term = 49

$$S_7 = 49$$

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

$$S_n = \frac{7}{2}[2 \times a + (7-1)d]$$

$$\frac{7}{2}[2a + 6d] = 49$$

$$7(a + 3d) = 49$$

$$a + 3d = \frac{49}{7}$$

$$a + 3d = 7 \dots \dots \dots (1)$$

Sum of first 17 term = 289

$$S_{17} = 289$$

$$S_7 = 289$$

$$\frac{17}{2}[2a + (17-1)d] = 289$$

$$\frac{17}{2}[2a + 16d] = 289$$

$$17(a + 8d) = 289$$

$$a + 8d = \frac{289}{17}$$

$$a + 8d = 17 \dots \dots \dots (2)$$

Solving equation (1) and equation (2) we get

$$a = 1$$

$$d = 2$$

(Contd.....)