MATHEMATICS Chapter–5

Arithmetic Progression

EXERCISE 5.3

(ii) 34 + 32 + 30 + . ……. . + 10

Soln:- Here a= 34

$d = 32-34 = -2$ **l = 10**

Let the number of terms of the AP be *n*, We know that

l = a + (n-1)d

$10 = 34+(n-1)(-2)$

$= (n-1)(-2) = -12$

$(n-1) = \frac{-24}{-2} = 12$

$n = 13$

We know that

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

$S_{13} = \frac{13}{2}[34+10]$

$S_{13} = 286$

Hence The required Sum is 286

3. In an AP:

(i) given a = 5, d = 3, a_n = 50, find n and S_n.

(ii) given a = 7, a_{13} = 35, find d and S_{13}.

(iii) given a_{12} = 37, d = 3, find a and S_{12}.

(iv) given a_3 = 15, S_{10} = 125, find d and a_{10}.

(v) given d = 5, S_9 = 75, find a and a_9.

(vi) given a = 2, d = 8, S_n = 90, find n and a_n.

(vii) given a = 8, a_n = 62, S_n =210, find n and d.

(viii) given a_n = 4, d = 2, S_n = –14, find n and a.

(ix) given a = 3, n = 8, S = 192, find d.

(x) given l = 28, S = 144, and there are total 9 terms. Find a.

Soln:- (1) (i) given a = 5, d = 3, a_n = 50, find n and S_n.

Here a = 5,

d = 3,

a_n = 50

We know that

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

$50 = 5 + (n-1)(3)$

$(n-1)(3) = 50 - 5$

$(n-1)(3) = 45$

$(n-1) = 45/3$

$n-1 = 15$

$n = 15+1 = 16$

We know that

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

$$Sn = \frac{16}{2}[2(5)+(16-1)(3)]$$

$$Sn = 8[10+45]$$

$$= 8(55)$$

$$= 440$$

(ii) given a = 7, a_{13} = 35, find d and S_{13}.

Soln:- **a = 7,**

a 13 = 35

We know that

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

$a_{13} = a + (13-1)(d)$

$a_{13} = a + (12)(d)$

$35 = 7 + 12d$

$12d = 28$

$d = 28/12$

$d = 7/3$

We know that

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

$$S_{13} = \frac{13}{2}[2(a)+(13-1)(d)]$$

$$S_{13} = \frac{13}{2}[2a+(12)(d)]$$

$$S_{13} = \frac{13}{2}\left[2(7)+(12)(\frac{7}{3})\right]$$

$$S_{13} = \frac{13}{2}[14+28]$$

$$S_{13} = \frac{13}{2}[42]$$

$$S_{13} = (13)(21)$$

$$S_{13} = 273$$

(iii) given a_{12} = 37, d = 3, find a and S_{12}.

Here a_{12} = 37,

d = 3

We know that

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

$a_{12} = a + (12-1)(d)$

$a_{12} = a + (11)(d)$

$37 = a + 11d$

$37 = a + 11 \times 3$

$a = 37-33 = 4$

We know that

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

$$S_{12} = \frac{12}{2}[2a+(12-1)d]$$

$$S_{12} = 6(2a+11d)$$

$$S_{12} = 6(2x4+11x3)$$

$$S_{12} = 6(8+33)$$

$$S_{12} = 6x41$$

$$S_{12} = 246$$

(iv) Given a_3 = 15, S_{10} = 125, find d and a_{10}.

Here a_3 = 15,

S_{10} = 125,

We know that

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

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

$a_3 = a + (2)(d)$

$15 = a + 2d$

$a + 2d = 15$

We know that

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

$$S_{10} = \frac{10}{2}[2a+(10-1)d]$$

$$S_{10} = 5(2a+9d)$$