

MATHEMATICS Chapter-5

Arithmetic Progression

EXERCISE 5.3

3. In an AP:

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

Soln:- (.....Contd)

is inadmissible as n , being the number of term, is a natural number

$\therefore n = 7$

Putting $n = 7$ in equation (1) we get

$$a + 2(7) = 6$$

$$a + 14 = 6$$

$$a = 6 - 14$$

$$a = -8$$

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

Soln:-

Here $a = 3$,

$$n = 8,$$

$$S = 192$$

We know that

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

$$192 = \frac{8}{2}[2(3) + (8-1)d]$$

$$192 = 4[6 + 7d]$$

$$\frac{192}{4} = 6 + 7d$$

$$48 = 6 + 7d$$

$$48 - 6 = 7d$$

$$42 = 7d$$

$$d = 42 / 7$$

$$d = 6$$

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

Soln:-

Here $l = 28$,

$$S = 144$$

$$N = 9$$

We know that

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

$$114 = \frac{9}{2}[(a) + 28]$$

$$\frac{(114)(2)}{9} = a + 28$$

$$32 = a + 28$$

$$a + 28 = 32$$

$$a = 32 - 28$$

$$a = 4$$

4) How many terms of the AP : 9, 17, 25, must be taken to give a sum of 636?

Sol: The given is 9, 17, 25, ...

Here $a = 9$

$$d = 17 - 9 = 8$$

Let n term of the AP must be taken

Then $S_n = 636$

$$\frac{n}{2}[2a + (n-1)d] = 636$$

$$\frac{n}{2}[2(9) + (n-1)8] = 636$$

$$n[9 + (n-1)4] = 636$$

$$n[9 + 4n - 4] = 636$$

$$n[4n + 5] = 636$$

$$4n^2 + 5n = 636$$

$$4n^2 + 5n - 636 = 0$$

$$4n^2 + 53n - 48n - 636 = 0$$

$$n(4n + 53) - 12(4n + 53) = 0$$

$$(4n + 53)(n - 12) = 0$$

$$(4n + 53) = 0$$

or

$$(n - 12) = 0$$

$$n = -\frac{53}{4}$$

Is inadmissible as n , being the number of terms is a natural number

$\therefore n = 12$

Hence, 12 terms of the AP must be taken

5. The first term of an AP is 5, the last term is 45 and the sum is 400. Find the number of terms and the common difference.

Soln:- Here $a = 5$ $l = 45$ $S = 400$

We know that

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

$$400 = \frac{n}{2}[5 + 45]$$

$$400 = \frac{n}{2}[50]$$

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

$$400 = \frac{n}{2}[5 + 45]$$

$$400 = \frac{n}{2}[50]$$

$$400 = 25n$$

$$n = \frac{400}{25}$$

$$n = 16$$

Hence, the number of term is 16

Again We know that

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

$$45 = 5 + (16-1)d$$

$$45 - 5 = 15d$$

$$15d = 40$$

$$d = 40/15$$

$$d = 8/3$$

Hence, the common difference is $8/3$

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:-

(Contd.....)