MATHEMATICS Chapter–1
Arithmetic Progression

6) A manufacturer of TV sets produced 600 sets in the third year and 700 sets in the seventh year. Assuming that the production increases uniformly by a fixed number every year, find :
(i) the production in the 1st year
(ii) the production in the 10th year
(iii) the total production in first 7 years

Soln: **(…..Contd)**

$d = 25$ and $a = 550$.

Therefore, production of TV sets in the first year is 550.

(ii) Now

$a_{10} = a + 9d = 550 + 9 \times 25 = 775$

So, production of TV sets in the 10th year is 775.

(iii) Also,

$$S_7 = \frac{7}{2}[2x550+(7-1)25]$$

$$= \frac{7}{2}[1100+150] = 4375$$

Thus, the total production of TV sets in first 7 years is 4375.

EXERCISE 5.3

1. Find the sum of the following APs:
(i) 2, 7, 12, . . ., to 10 terms.
(ii) –37, –33, –29, . . ., to 12 terms.
(iii) 0.6, 1.7, 2.8, . . ., to 100 terms.
(iv) $\frac{1}{15}, \frac{1}{12}, \frac{1}{10}$.............. *to 11 terms*

Soln:-

(i) 2, 7, 12, . . ., to 10 terms.

Here a= 2 d= 7-2= 5 n= 10

We know that

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

$$S_{10} = \frac{10}{2}[2x2+(10-1)5]$$

$$S_{10} = 5[4+45] = 245$$

So,the sum of the first 10 term of the given AP is 245

(ii) –37, –33, –29, . . ., to 12 terms.

Here a= -37
d= -33 –(-37) = 5 n= 12

We know that

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

$$S_{12} = \frac{12}{2}[2(-37)+(12-1)4]$$

$$S_{12} = 6[-74+44]$$

$$= 6(-30) = -180$$

So,the sum of the first 12 term of the given AP is -180

(iii) 0.6, 1.7, 2.8, . . ., to 100 terms.

Here a= 0.6 d= 1.7–(0.6) = 1.1
n= 100

We know that

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

$$S_{100} = \frac{100}{2}[2(0.6)+(100-1)(1.1)]$$

$$S_{100} = 50[1.2+108.9]$$

$$= 50(110.1)$$

$$= 5505$$

So,the sum of the first 100 term of the given AP is 5505

(iv) $\frac{1}{15}, \frac{1}{12}, \frac{1}{10}$.............. *to 11 terms*

Here a= 1/15

$$d = \frac{1}{12}, -\frac{1}{15} = \frac{1}{60}$$

n= 11

We know that

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

$$S_{11} = \frac{11}{2}\left[2\left(\frac{1}{15}\right)+(11-1)\left(\frac{1}{60}\right)\right]$$

$$S_{11} = \frac{11}{2}\left(\frac{2}{15}+\frac{1}{6}\right)$$

$$S_{11} = \frac{11}{2}\left(\frac{3}{10}\right)$$

$$S_{11} = \frac{33}{20}$$

So,the sum of the first 11 term of the given AP is 33/20

2. Find the sums given below :
(i) $7+10\frac{1}{2}+14+$............... $+84$
(ii) 34 + 32 + 30 + . . . + 10
(iii) –5 + (–8) + (–11) + . . . + (–230)

Soln:-

(i) $7+10\frac{1}{2}+14+$.............. $+84$

Here a= 7

$$d = 10\frac{1}{2}-7 = 3\frac{1}{2} = \frac{7}{2}$$

Let the number of terms of the AP be n , We know that
l = a + (n-1)d

$$84 = 7+(n-1)\frac{7}{2}$$

$$=(n-1)\frac{7}{2} = 84-7$$

$$(n-1) = 22$$

$$n = 22+1$$

$$n = 23$$

We know that

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

$$S_{23} = \frac{23}{2}[7+84]$$

$$S_{23} = \frac{2093}{2}$$

$$S_{23} = 1046\frac{1}{2}$$

Hence The required Sum is $1046\frac{1}{2}$

(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

$$S_n = \frac{n}{2}[a+l]$$ *(Contd….)*