Points to be remember:

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

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

or,

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

where l denotes the last term

i.e. a_n

10th Mathematics (NCERT)

Exercise – 5.3

1. (i) Solution.

The given A.P. is $2, 7, 12, \ldots a_{10}$

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

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

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

$= 5[4 + 9 \times 5]$

$= 5[4 + 45]$

$= 5 \times 49$

$= 245$

1(ii) $-37, -33, -29, \ldots$ to 12 terms.

Here $a = -37$, $d = -33 - (-37) = 4$ and $n = 12$

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

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

$= 6 \times [-74 + 44]$

$= 6 \times (-30)$

$= -180.$

Notes

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

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

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

Exercise - 5.3

1. (iii) $0.6, 1.7, 2.8, \ldots$ to 100 terms

Here, $a = 0.6$, $d = 1.7 - 0.6 = 1.1$, $n = 100$

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

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

$= 50[1.2 + 108.9]$

$= 50 \times 110.1$

$= 5505$ //

99
1.1
108.9

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

Here, $a = \frac{1}{15}$, $d = \frac{1}{12} - \frac{1}{15} = \frac{5-4}{60} = \frac{1}{60}$

and $n = 11$

$S_{11} = \frac{11}{2}[2 \times \frac{1}{15} + (11-1) \times \frac{1}{60}]$ $\left[\because S_n = \frac{n}{2}[2a + (n-1)d]\right]$

$= \frac{11}{2}[\frac{2}{15} + \frac{1}{6}]$

$= \frac{11}{2}[\frac{4+5}{30}]$

$= \frac{11}{2} \times \frac{3}{10}$

$= \frac{33}{20}$ //

Notes

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

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

Exercise - 5.3

Sol. 2(i)

$7 + 10\frac{1}{2} + 14 + \ldots + 84$

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

and $a_n = 84$

$\Rightarrow a + (n-1)d = 84$ $\quad [\because n\text{th term}, a_n = a + (n-1)d]$

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

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

$\Rightarrow (n-1) \times \frac{7}{2} = 77$

$\Rightarrow n - 1 = 77 \times \frac{2}{7}$

$\Rightarrow n - 1 = 22$

$\Rightarrow n = 22 + 1$

$\Rightarrow n = 23$

Now, $S_{23} = \frac{23}{2}[7 + 84]$ $\quad [\because S_n = \frac{n}{2}[a + l]]$

$= \frac{23}{2} \times 91$

$= \frac{2093}{2}$

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

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

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

Ex. 5.3

2(ii) $34+32+30+\cdots+10$

Here, $a=34$, $d=32-34=-2$

Last term, $l=a_n=10$

i.e. $a+(n-1)d=10$

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

$\Rightarrow (n-1)\times(-2)=10-34$

$\Rightarrow (n-1)\times(-2)=-24$

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

$\Rightarrow n-1=12$

$\Rightarrow n=13$

Now, $S_{13}=\frac{13}{2}[34+10]$ $[\because S_n=\frac{n}{2}[a+l$

$=\frac{13}{2}\times 44$

$=13\times 22$

$=286$

Ex. 5.3.

9 am **2(iii)** $-5+(-8)+(-11)+\cdots+(-230)$

Here

10 am $a=-5$, $d=-8-(-5)=-8+5=-3$

11 am and, $l=a_n=-230$

$\Rightarrow a+(n-1)d=-230$

12 noon $\Rightarrow -5+(n-1)\times(-3)=-230$

$\Rightarrow (n-1)(-3)=-230+5$

1 pm $\Rightarrow (n-1)(-3)=-225$

2 pm $\Rightarrow n-1=\frac{-225}{-3}$

3 pm $\Rightarrow n-1=75$

$\Rightarrow n=76$

4 pm

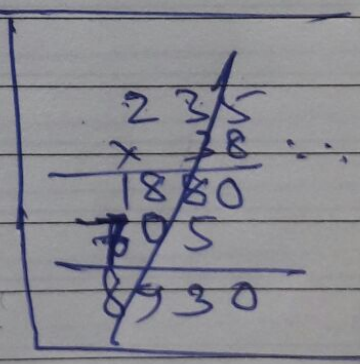
$\therefore S_{76}=\frac{76}{2}[-5+(-230)]$

5 pm $\left[\because S_n=\frac{n}{2}[a+l]\right]$

6 pm $=\frac{76}{2}[-5-230]$

$=38\times(-235)$

7 pm $=-8930$



Notes