NCERT Solutions For Class 10 Chapter 5 Maths Arithmetic Progressions Exercise 5.3

1. Find the sum of the following AP's.

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

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

Here First term = a = 2,

Common difference = d = 7 − 2 = 5 and n = 10

Applying formula, $S_n = \frac{n}{2}[2a+(n-1)d]$ to find sum of n terms of AP,

$$S_n = \frac{10}{2}[4+(10-1)5] = 5(4+45) = 5\times 49 = 245$$

(ii) −37, −33, −29... to 12 terms

Here First term = a = −37, Common difference = d = −33 − (−37) = 4

And n = 12

Applying formula, $S_n = \frac{n}{2}[2a+(n-1)d]$ to find sum of n terms of AP,

$$S_n = \frac{12}{2}[-74+(12-1)4] = 6(-74+44) = 6\times(-30) = -180$$

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

Here First term = a = 0.6, Common difference = d = 1.7 − 0.6 = 1.1

And n = 100

Applying formula, $S_n = \frac{n}{2}[2a+(n-1)d]$ to find sum of n terms of AP,

$$S_n = \frac{100}{2}[1.2+(100-1)1.1] = 50(1.2+108.9) = 50\times 109.5 = 5505$$

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

Here First tern =a = $\frac{1}{15}$ Common difference = d

$$-\frac{1}{12}-\frac{1}{15} = \frac{5-4}{60} = \frac{1}{60}$$

Applying formula, $S_n = \frac{n}{2}[2a+(n-1)d]$ to find sum of n terms of AP,

$$S_n = \frac{11}{2}\left[\frac{2}{15}+(11-1)\frac{1}{60}\right] = \frac{11}{2}\left(\frac{2}{15}+\frac{1}{6}\right) = \frac{11}{2}\left(\frac{4+5}{30}\right) = \frac{11}{2}\times\frac{9}{30} = \frac{33}{20}$$

2. Find the sums given below:

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

(ii) 34 + 32 + 30 + ... + 10

(iii) −5 + (−8) + (−11) + ... + (−230)

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

Here First term = a = 7, Common difference = d

$= \frac{21}{2}-7 = \frac{21-14}{2} = \frac{7}{2} = 3.5$

And Last term = l = 84

We do not know how many terms are there in the given AP.

So, we need to find n first.

Using formula $a_n = a+(n-1)d$, to find n^{th} term of arithmetic progression,

$[7 + (n - 1)(3.5)] = 84$

$\Rightarrow 7 + (3.5)n - 3.5 = 84$

$\Rightarrow 3.5n = 84 + 3.5 - 7$

$\Rightarrow 3.5n = 80.5$

$\Rightarrow n = 23$

Therefore, there are 23 terms in the given AP.

It means n = 23.

Applying formula, $S_n = \frac{n}{2}(a+l)$ to find sum of n terms of AP,

$$S_{23} = \frac{23}{2}(7+84)$$

$$\Rightarrow S_{23} = \frac{23}{2}\times 91 = 1046.5$$

(ii) $34 + 32 + 30 + ... + 10$

Here First term = a = 34, Common difference = d = 32 − 34 = −2

And Last term = l = 10

We do not know how many terms are there in the given AP.

So, we need to find n first.

Using formula $a_n = a + (n-1)d$, to find n^{th} term of arithmetic progression,

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

$\Rightarrow 34 - 2n + 2 = 10$

$\Rightarrow -2n = -26 \Rightarrow n = 13$

Therefore, there are 13 terms in the given AP.

It means n = 13.

Applying formula, $S_n = \frac{n}{2}(a+l)$ to find sum of n terms of AP,

$$S_{13} = \frac{13}{2}(34+10) = \frac{13}{2} \times 44 = 286$$

(iii) $-5 + (-8) + (-11) + \ldots + (-230)$

Here First term = a = −5, Common difference = d = −8 − (−5) = −8 + 5 = −3

And Last term = l = −230

We do not know how many terms are there in the given AP.

So, we need to find n first.

Using formula $a_n = a + (n-1)d$, to find n^{th} term of arithmetic progression,

$[-5 + (n-1)(-3)] = -230$

$\Rightarrow -5 - 3n + 3 = -230$

$\Rightarrow -3n = -228 \Rightarrow n = 76$

Therefore, there are 76 terms in the given AP.

It means n = 76.

Applying formula, $S_n = \frac{n}{2}(a+l)$ to find sum of n terms of AP,

$$S_{76} = \frac{76}{2}(-5-230) = 38 \times (-235) = -8930$$

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 of 9 terms. Find a.

Ans. (i) Given $a = 5, d = 3, a_n = 50$, find n *and* S_n.

Using formula $a_n = a + (n-1)d$, to find nth term of arithmetic progression,

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

$\Rightarrow 50 = 5 + 3n - 3$

$\Rightarrow 48 = 3n \Rightarrow n = 16$

Applying formula, $S_n = \frac{n}{2}[2a + (n-1)d]$ to find sum of n terms of AP,

$$S_{16} = \frac{16}{2}[10 + (16-1)3] = 8(10+45) = 8 \times 55 = 440$$

Therefore, $n = 16$ and $S_n = 440$

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

Using formula $a_n = a + (n-1)d$, to find nth term of arithmetic progression,

$a_{13} = 7 + (13-1)(d)$

********** END **********