Arithematic Progressions Ex 19.2 Q4

(i) Is 68 a term of A.P 7, 10, 13, ...?

Here, $a = 7$

and $x = 10 - 7 = 3$

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

$= 7 + (n-1)3$

Let 68 be nth temr of A.P

Then,

$68 = 7 + 3(n-1)$

$\Rightarrow$ $68 = 7 + 3n - 3$

$\Rightarrow$ $68 - 4 = 3n$

$\Rightarrow$ $64 = 3n$

$\Rightarrow$ $n = \frac{64}{3}$

Which is not a natural number.

$\therefore$ 68 is nota term of given A.P.

(ii) Is 302 a term of A.P 3, 8, 13

Let 302 be nth ter, pf tje given A.P

Here, $302 = 3 + (n-1)5$

$\frac{299}{5} = (n-1)$

$n = \frac{304}{5}$

Which is not a natural number.

$\therefore$ 302 is not a term of given A.P.

(i) The given sequence is $24, 23\frac{1}{4}, 22\frac{1}{2}, 21\frac{3}{4}, \ldots$

Here, $a = 24$

$$d = 23\frac{1}{4} - 24 = \frac{93 - 96}{4} = \frac{-3}{4}$$

Let nth term be the 1st negative term.

$$a_n < 0$$

$$a + (n-1)d < 0$$

$$24 - \frac{3}{4}(n-1) < 0$$

$$96 - 3n + 3 < 0$$

$$99 < 3n$$

$$33 < n \qquad \text{or} \qquad n > 33$$

$\therefore$ 34th term is 1st negative term.

(ii) The given sequence is $12 + 8i,\ 11 + 6i,\ 10 + 4i, \ldots$

Here, $a = 12 + 8i$

$$d = -1 - 2i$$

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

$$= 12 + 8i + (n-1)(-1 - 2i)$$

$$= (13 - n) + i(10 - 2n)$$

Let nth term be purely real the $(10 - 2n) = 0$ or $n = 5$

So, 5th term is purely real.

Let nth term be purely imaginary. Then, $13 - n = 0$

$\therefore \quad n = 13$

So, 13th term is purely imaginary.

Arithematic Progressions Ex 19.2 Q6

(i) The given A.P is $7, 10, 13, \ldots 43$.

Let there be n terms,

then, n term = 43

or $\quad 43 = a_n = a + (n-1)d$

$\Rightarrow \quad 43 = 7 + (n-1)3$

$\Rightarrow \quad n = 13$

Thus, there are 13 terms in the given sequence.

(ii) The given A.P is $-1, \frac{-5}{6}, \frac{-2}{3}, \frac{-1}{2}, \ldots, \frac{10}{3}$?

Let there be n terms

then, nth term = $\frac{10}{3}$

or $\quad \frac{10}{3} = a_n = a + (n-1)d$

$\Rightarrow \quad \frac{10}{3} = -1 + (n-1)\left(\frac{-5}{6} + 1\right)$

$\Rightarrow \quad n = 27$

Thus, there are 27 terms in the given sequence.

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