Arithmetic Progressions Ex 9.3 Q13

Answer :

In the given problem, we need to find the 12th term from the end for the given A.P.

(i) 3, 5, 7, 9 ...201

Here, to find the 12th term from the end let us first find the total number of terms. Let us take the total number of terms as n.

So,

First term (a) = 3

Last term (a_n) = 201

Common difference (d) = $5-3$

$=2$

Now, as we know,

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

So, for the last term,

$201 = 3+(n-1)2$

$201 = 3+2n-2$

$201 = 1+2n$

$201-1 = 2n$

Further simplifying,

$200 = 2n$

$n = \frac{200}{2}$

$n = 100$

So, the 12th term from the end means the 89th term from the beginning.

So, for the 89th term (n = 89)

$a_{89} = 3+(89-1)2$

$=3+(88)2$

$=3+176$

$=179$

Therefore, the 12th term from the end of the given A.P. is $\boxed{179}$.

(ii) 3, 8, 13 ...253

Here, to find the 12th term from the end let us first find the total number of terms. Let us take the total number of terms as n.

So,

First term (a) = 3

Last term (a_n) = 253

Common difference, d = $8-3$

$=5$

Now, as we know,

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

So, for the last term,

$253 = 3+(n-1)5$

$253 = 3+5n-5$

$253 = -2+5n$

$253+2 = 5n$

$$255 = 5n$$

$$n = \frac{255}{5}$$

$$n = 51$$

So, the 12th term from the end means the 40th term from the beginning.

So, for the 40th term (n = 40)

$$a_{40} = 3 + (40 - 1)5$$

$$= 3 + (39)5$$

$$= 3 + 195$$

$$= 198$$

Therefore, the 12th term from the end of the given A.P. is $\boxed{198}$.

(iii) 1, 4, 7, 10 ...88

Here, to find the 12th term from the end let us first find the total number of terms. Let us take the total number of terms as n.

So,

First term (a) = 1

Last term (a_n) = 88

Common difference, d= $4 - 1$ =3

Now, as we know,

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

So, for the last term,

$$88 = 1 + (n - 1)3$$

$$88 = 1 + 3n - 3$$

$$88 = -2 + 3n$$

$$88 + 2 = 3n$$

Further simplifying,

$$90 = 3n$$

$$n = \frac{90}{3}$$

$$n = 30$$

So, the 12th term from the end means the 19th term from the beginning.

So, for the 19th term (n = 19)

$$a_{19} = 1 + (19 - 1)3$$

$$= 1 + (18)3$$

$$= 1 + 54$$

$$= 55$$

Therefore, the 12th term from the end of the given A.P. is $\boxed{55}$.

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