

## FlexiPrep

### CBSE Class 10-Mathematics: Chapter – 5 Arithmetic Progressions Part 8 (For CBSE, ICSE, IAS, NET, NRA 2022)

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#### Question 3:

Which term of the AP: 3,8,13,18 ... is 78 ?

#### Answer:

First term =  $a = 3$  , Common difference =  $d = 8-3 = 13-8 = 5$  and  $a_n = 78$

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

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

$$\Rightarrow 78 = 3 + (n - 1) 5$$

$$\Rightarrow 75 = 5n - 5$$

$$\Rightarrow 80 = 5n$$

$$\Rightarrow n = 16$$

It means 16<sup>th</sup> term of the given AP is equal to 78 .

#### Question 4:

Find the number of terms in each of the following APs:

(i) 7,13,19 ... ,205

(ii)  $18, 15\frac{1}{2}, 13, \dots, -47$

#### Answer:

(i) 7,13,19 ... ,205

First term =  $a = 7$  , Common difference =  $d = 13-7 = 19-13 = 6$

And  $a_n = 205$

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

$$205 = 7 + (n - 1) 6 = 7 + 6n - 6$$

$$\Rightarrow 205 = 6n + 1$$

$$\Rightarrow 204 = 6n$$

$$\Rightarrow n = 34$$

Therefore, there are 34 terms in the given arithmetic progression.

$$(ii) 18, 15\frac{1}{2}, 13, \dots, -47$$

First term =  $a = 18$ , Common difference

$$= d = 15\frac{1}{2} - 18 = \frac{31}{2} - 18 = \frac{31 - 36}{2} = \frac{-5}{2}$$

$$\text{And } a_n = -47$$

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

$$-47 = 18 + (n - 1)\left(-\frac{5}{2}\right) = 36 - \frac{5}{2}n + \frac{5}{2}$$

$$\Rightarrow -94 = 36 - 5n + 5$$

$$\Rightarrow 5n = 135$$

$$\Rightarrow n = 27$$

Therefore, there are 27 terms in the given arithmetic progression

### Question 5:

Check whether  $-150$  is a term of the AP:  $11, 8, 5, 2, \dots$

**Answer:**

Let  $-150$  is the  $n^{\text{th}}$  of AP  $11, 8, 5, 2, \dots$  which means that  $a_n = -150$

Here, First term =  $a = 11$ , Common difference =  $d = 8 - 11 = -3$

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

$$-150 = 11 + (n - 1)(-3)$$

$$\Rightarrow -150 = 11 - 3n + 3$$

$$\Rightarrow 3n = 164$$

$$\Rightarrow n = \frac{164}{3}$$

But,  $n$  cannot be in fraction.

Therefore, our supposition is wrong.  $-150$  cannot be term in AP.

### Question 6:

An AP consists of 50 terms of which 3<sup>rd</sup> term is 12 and the last term is 106 . Find the 29<sup>th</sup> term.

**Answer:**

An AP consists of 50 terms and the 50<sup>th</sup> term is equal to 106 and  $a_3 = 12$

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

$$a_{50} = a + (50 - 1) d \text{ And } a_3 = a + (3 - 1) d$$

$$\Rightarrow 106 = a + 49d \text{ And } 12 = a + 2d$$

These are equations consisting of two variables.

Using equation  $106 = a + 49d$  , we get  $a = 106 - 49d$

Putting value of  $a$  in the equation  $12 = a + 2d$  ,

$$12 = 106 - 49d + 2d$$

$$\Rightarrow 47d = 94$$

$$\Rightarrow d = 2$$

Putting value of  $d$  in the equation,  $a = 106 - 49d$  ,

$$a = 106 - 49(2) = 106 - 98 = 8$$

Therefore, First term =  $a = 8$  and Common difference =  $d = 2$

To find 29<sup>th</sup> term, we use formula  $a_n = a +$

$(n - 1) d$  which is used to find  $n^{\text{th}}$  term of arithmetic progression,

$$a_{29} = 8 + (29 - 1) 2 = 8 + 56 = 64$$

Therefore, 29<sup>th</sup> term of AP is equal to 64