NCERT Question 10.5.2.5

EE23BTECH11032 - Kaustubh Parag Khachane *

Question 10.5.2.5 : Find the number of terms in each of the following APs :
(i) 7, 13, 19, ... 205
(ii) 18, $15\frac{1}{2}$, 13, ... -47

Solution :

(i) The n^{th} term of the Arithmetic progression is given as a + (n-1)*d where a is the first term and d is the common difference.

The common difference of the AP is given by the difference between successive terms.

Common difference (d) = 13 - 7 = 6
First term (a) = 7

If 205 is the *nth* term of the series, we have :

$$\begin{aligned} 205 &= 7 + (n-1) * 6 \\ \implies 198 &= (n-1) * 6 \\ \implies 33 &= n - 1 \\ \implies n &= 34 \end{aligned}$$

Answer : There are 34 elements in the series.

(ii) The n^{th} term of the Arithmetic progression is given as a + (n-1)*d where a is the first term and d is the common difference.

The common difference of the AP is given by the difference between successive terms.

Common difference (d) = $15\frac{1}{2}$ - 18 = $-2\frac{1}{2}$
First term (a) = 18

If -47 is the *nth* term of the series, we have :

$$\begin{aligned} -47 &= 18 + (n-1) * \left(-2\left(\frac{1}{2}\right)\right) \\ \implies -65 &= (n-1) * \left(-2\left(\frac{1}{2}\right)\right) \\ \implies 26 &= n - 1 \\ \implies n &= 27 \end{aligned}$$

Answer : There are 27 elements in the series.