

CHAPTER 05**Arithmetic Progressions** **n^{th} term from the end of an A.P:**

If 'a' and 'b' are the first term and common difference respectively on an A.P with 'n' terms, then

$$\begin{aligned} n^{\text{th}} \text{ term from the end} &= (n - m + 1)^{\text{th}} \text{ term from beginning} \\ &= a_{(n-m+1)} = a + (n - m) d \end{aligned}$$

In alternate way:

First write the given A.P in reverse order, then 'a' will be last term (say 'l') and common difference will be (-d).

Now,

$$\begin{aligned} n^{\text{th}} \text{ term from the end} &= n^{\text{th}} \text{ term of new A.P} = l + (n - 1) (-d) = l \\ &- (n - 1) d \quad (\because a_n = a + (n - 1)d) \end{aligned}$$

Example:

Find the 10^{th} term from the end of the A.P. 4, 9, 14...254.

Sol.

Given,

A.P is 4, 9, 14...254

Here, first term $(a) = 4$

Common difference $(d) = 9 - 4 = 5$

Last term $(l) = 254$

$$n = 10$$

Now,

$$n^{\text{th}} \text{ term from the end} = l - (n - 1)d$$

$$= 254 - (10 - 1)5$$

$$= 254 - (9 \times 5)$$

$$= 254 - 45$$

$$= 209$$

Hence, the 10^{th} term from the end is 209.

