

AI1110

Assignment 1

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1 ICSE 2018 GRADE 10
QUESTION 11(A)

The 4th term of an A.P. is 22 and 15th term is 66.
Find the first term and the common difference. Hence find the sum of series upto 8th term.

2 SOLUTION

Given the 4th term of the A.P. is 22
15th term of A.P. is 66

Let first term of A.P. be a
Let common difference of A.P. be d

The n th (a_n) term of any Arithmetic progression is given by
 $a_n = a + (n - 1)d$

So,

$$\begin{aligned}a_4 &= a + 3d = 22 \\a_{15} &= a + 14d = 66\end{aligned}$$

Subtracting above 2 equations we get,

$$\begin{aligned}11d &= 44 \\d &= 4\end{aligned}$$

Putting the value of d in a_4 equation

$$\begin{aligned}a + 3(4) &= 22 \\a &= 10\end{aligned}$$

Hence 1st term of the A.P. is 10 and common difference is 4.

Sum of an A.P till n terms is given by

$$S_n = \left(\frac{n}{2}\right)(2a + (n - 1)d)$$

So, sum of A.P till 8th term is

$$\begin{aligned}S_8 &= \frac{8}{2}(2(10) + (8 - 1)4) \\S_8 &= 4(20 + 28) \\S_8 &= 192\end{aligned}$$