AI1110
Assignment 1

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1 ICSE 2018 Grade 10 Question 11(a)

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

2 Solution

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

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

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

So,

$$a_4 = a + 3d = 22 \tag{2.0.1}$$
$$a_{15} = a + 14d = 66 \tag{2.0.2}$$

Subtracting (2.0.1) and (2.0.2) we get,

$$11d = 44 \tag{2.0.3}$$
$$d = 4 \tag{2.0.4}$$

Putting the value of d in a_4 equation

$$a + 3(4) = 22 \tag{2.0.5}$$
$$a = 10 \tag{2.0.6}$$

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

$$S_n = (\frac{n}{2}(2a + (n-1)d) \tag{2.0.7}$$

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

$$S_8 = \frac{8}{2}(2(10) + (8-1)4 \tag{2.0.8}$$
$$S_8 = 4(20 + 28) \tag{2.0.9}$$
$$S_8 = 192 \tag{2.0.10}$$