

# AI1110

## Assignment 1

Mahin Bansal  
cs21btech11034

### 1 ICSE 2018 GRADE 10 QUESTION 11(A)

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

### 2 SOLUTION

Let m<sup>th</sup> and n<sup>th</sup> term of an A.P be  $a_m$  and  $a_n$  respectively

Let first term of A.P. be  $a$

Let common difference of A.P. be  $d$

The x<sup>th</sup> ( $a_x$ ) term of any Arithmetic progression is given by

$$a_x = a + (x - 1)d$$

So,

$$a_m = a + (m - 1)d \quad (2.0.1)$$

$$a_n = a + (n - 1)d \quad (2.0.2)$$

Subtracting (2.0.1) and (2.0.2) we get,

$$(m - n)d = a_m - a_n \quad (2.0.3)$$

$$d = \frac{a_m - a_n}{m - n} \quad (2.0.4)$$

Putting the value of d in (2.0.1) equation

$$a + (m - 1)\left(\frac{a_m - a_n}{m - n}\right) = a_m \quad (2.0.5)$$

$$a = a_m - (m - 1)\left(\frac{a_m - a_n}{m - n}\right) \quad (2.0.6)$$

Given the 4<sup>th</sup> term of the A.P is 22

15<sup>th</sup> term of A.P. is 66

Putting the values of  $a_4$  and  $a_{15}$  in (2.0.1) and (2.0.2)

We get

$$a_4 = a + 3d = 22 \quad (2.0.7)$$

$$a_{15} = a + 14d = 66 \quad (2.0.8)$$

Putting the values of

$$m = 4$$

$$n = 15$$

$$a_m = 22$$

$$a_n = 66$$

in (2.0.4) and (2.0.6) we get 1st term of the A.P. is 10 and common difference is 4.

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

$$S_n = \left(\frac{n}{2}\right)(2a + (n - 1)d) \quad (2.0.9)$$

So, sum of A.P till 8<sup>th</sup> term is

$$S_8 = \frac{8}{2}(2(10) + (8 - 1)4) \quad (2.0.10)$$

$$S_8 = 4(20 + 28) \quad (2.0.11)$$

$$S_8 = 192 \quad (2.0.12)$$