

AI1110 Assignment 1

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Q2 (C): In an Arithmetic Progression, the fourth and sixth terms are 8 and 16 respectively. Find :

i) common difference

ii) first term

iii) sum of the first 20 terms

Solution: Let a_i denote the i th term of the AP ,
 d denote the common diff,
 s denote the sum of first 20 terms

TABLE I
VARIABLES

Symbol	value
a_4	8
a_6	14
a_1	?
d	?
s	?

TABLE II
ANSWERS

Symbol	value
a_1	-1
d	3
s	550

$$\begin{aligned}
 (i) \quad & a_4 + 2d = a_6 \\
 \Rightarrow & 2d = a_6 - a_4 \\
 & = 14 - 8 \\
 & = 6 \\
 \Rightarrow & d = \frac{6}{2} \\
 & d = 3 \text{ (Ans)}
 \end{aligned}$$

$$\begin{aligned}
 (ii) \quad & a_1 + 3d = a_4 \\
 \Rightarrow & a_1 = a_4 - 3d \\
 & = 8 - 3(3) \\
 & = 8 - 9 \\
 & a_1 = -1 \text{ (Ans)}
 \end{aligned}$$

$$n = 20$$

$$\begin{aligned}
 iii) \quad s &= a_1 + a_2 + \dots + a_{20} \\
 &= \frac{n \times [2a_1 + (n-1)d]}{2} \\
 &= \frac{20 \times [2(-1) + (20-1)3]}{2} \\
 &= \frac{20 \times [-2 + (19)3]}{2} \\
 &= \frac{20 \times [55]}{2} \\
 &= 550 \text{ (Ans)}
 \end{aligned}$$

Hence the common difference , first term , sum of first 20 terms are 3 , -1 , 550 respectively.