

CHAPTER-SEQUENCE & SERIES

D.O.E.-24/06/2026

MM-15

(1) Prove that the sum of n arithmetic means between two numbers is n times the single A. M. between them.

(2) Three numbers are in G. P. whose sum is 70. If the extremes be each multiplied by 4 and the means by 5, they will be in A. P. . Find the numbers.

(3) Find the sum of n terms of the sequence a_n given by $a_n = 2^n + 3n, n \in \mathbb{N}$.

(4) If $x = 1 + a + a^2 + \dots \cdot \infty$, where $|a| < 1$ and

$y = 1 + b + b^2 + \dots \cdot \infty$, where $|b| < 1$.

Prove that:

$$1 + ab + a^2b^2 + \dots \cdot \infty = \frac{xy}{x + y - 1}$$

(5) How many terms of the G. P. $3, \frac{3}{2}, \frac{3}{4}, \dots$ are needed to give the sum $\frac{3069}{512}$.