

Series

Qno.1

In the arithmetic series with n^{th} term u_n , it is given that $u_4 = 7$ and $u_9 = 22$.

Find the minimum value of n so that $u_1 + u_2 + u_3 + \dots + u_n > 10\,000$.

Qno.2

The first term and the common ratio of a geometric series are denoted, respectively, by a and r where $a, r \in \mathbb{Q}$. Given that the third term is 9 and the sum to infinity is 64, find the value of a and the value of r .

Qno.3

The sum of the first 16 terms of an arithmetic sequence is 212 and the fifth term is 8.

- a. Find the first term and the common difference. [4]
- b. Find the smallest value of n such that the sum of the first n terms is greater than 600. [3]

Qno.4

a. In an arithmetic sequence the first term is 8 and the common difference is $\frac{1}{4}$. If the sum of the first $2n$ terms is equal to the sum of the next n terms, find n . [9]

b. If a_1, a_2, a_3, \dots are terms of a geometric sequence with common ratio $r \neq 1$, show that [7]

$$(a_1 - a_2)^2 + (a_2 - a_3)^2 + (a_3 - a_4)^2 + \dots + (a_n - a_{n+1})^2 = \frac{a_1^2(1-r)(1-r^{2n})}{1+r}.$$

Qno.5

A geometric sequence has a first term of 2 and a common ratio of 1.05. Find the value of the smallest term which is greater than 500.