

Arithmetic and Geometric Progression

Question Paper 1

Level	International A Level
Subject	Maths
Exam Board	CIE
Topic	Series
Sub Topic	Arithmetic and Geometric Progression
Booklet	Question Paper 1

Time Allowed: 62 minutes

Score: /51

Percentage: /100

Grade Boundaries:

A*	A	B	C	D	E	U
>85%	77.5%	70%	62.5%	57.5%	45%	<45%

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- 1 (a) The third and fourth terms of a geometric progression are $\frac{1}{3}$ and $\frac{2}{9}$ respectively. Find the sum to infinity of the progression. [4]
- (b) A circle is divided into 5 sectors in such a way that the angles of the sectors are in arithmetic progression. Given that the angle of the largest sector is 4 times the angle of the smallest sector, find the angle of the largest sector. [4]
- 2 (a) The first, second and last terms in an arithmetic progression are 56, 53 and -22 respectively. Find the sum of all the terms in the progression. [4]
- (b) The first, second and third terms of a geometric progression are $2k + 6$, $2k$ and $k + 2$ respectively, where k is a positive constant.
- (i) Find the value of k . [3]
- (ii) Find the sum to infinity of the progression. [2]
- 3 (a) The first term of an arithmetic progression is -2222 and the common difference is 17. Find the value of the first positive term. [3]
- (b) The first term of a geometric progression is $\sqrt{3}$ and the second term is $2 \cos \theta$, where $0 < \theta < \pi$. Find the set of values of θ for which the progression is convergent. [5]
- 4 (i) A geometric progression has first term a ($a \neq 0$), common ratio r and sum to infinity S . A second geometric progression has first term a , common ratio $2r$ and sum to infinity $3S$. Find the value of r . [3]
- (ii) An arithmetic progression has first term 7. The n th term is 84 and the $(3n)$ th term is 245. Find the value of n . [4]
- 5 (a) The sum, S_n , of the first n terms of an arithmetic progression is given by $S_n = 32n - n^2$. Find the first term and the common difference. [3]
- (b) A geometric progression in which all the terms are positive has sum to infinity 20. The sum of the first two terms is 12.8. Find the first term of the progression. [5]

- 6 Three geometric progressions, P , Q and R , are such that their sums to infinity are the first three terms respectively of an arithmetic progression.

Progression P is $2, 1, \frac{1}{2}, \frac{1}{4}, \dots$

Progression Q is $3, 1, \frac{1}{3}, \frac{1}{9}, \dots$

- (i) Find the sum to infinity of progression R . [3]
- (ii) Given that the first term of R is 4, find the sum of the first three terms of R . [3]
- 7 An arithmetic progression has first term a and common difference d . It is given that the sum of the first 200 terms is 4 times the sum of the first 100 terms.
- (i) Find d in terms of a . [3]
- (ii) Find the 100th term in terms of a . [2]