

# Arithmetic and Geometric Progression

## Question Paper 5

<b>Level</b>	International A Level
<b>Subject</b>	Maths
<b>Exam Board</b>	CIE
<b>Topic</b>	Series
<b>Sub Topic</b>	Arithmetic and Geometric Progression
<b>Booklet</b>	Question Paper 5

**Time Allowed:** 60 minutes

**Score:** /50

**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 first and second terms of an arithmetic progression are 161 and 154 respectively. The sum of the first  $m$  terms is zero. Find the value of  $m$ . [3]
- (b) A geometric progression, in which all the terms are positive, has common ratio  $r$ . The sum of the first  $n$  terms is less than 90% of the sum to infinity. Show that  $r^n > 0.1$ . [3]
- 2 (a) A geometric progression has first term 100 and sum to infinity 2000. Find the second term. [3]
- (b) An arithmetic progression has third term 90 and fifth term 80.
- (i) Find the first term and the common difference. [2]
- (ii) Find the value of  $m$  given that the sum of the first  $m$  terms is equal to the sum of the first  $(m + 1)$  terms. [2]
- (iii) Find the value of  $n$  given that the sum of the first  $n$  terms is zero. [2]
- 3 The ninth term of an arithmetic progression is 22 and the sum of the first 4 terms is 49.
- (i) Find the first term of the progression and the common difference. [4]
- The  $n$ th term of the progression is 46.
- (ii) Find the value of  $n$ . [2]
- 4 (a) Find the sum of all the multiples of 5 between 100 and 300 inclusive. [3]
- (b) A geometric progression has a common ratio of  $-\frac{2}{3}$  and the sum of the first 3 terms is 35. Find
- (i) the first term of the progression, [3]
- (ii) the sum to infinity. [2]
- 5 The first term of a geometric progression is 12 and the second term is  $-6$ . Find
- (i) the tenth term of the progression, [3]
- (ii) the sum to infinity. [2]

- 6 The first term of an arithmetic progression is 8 and the common difference is  $d$ , where  $d \neq 0$ . The first term, the fifth term and the eighth term of this arithmetic progression are the first term, the second term and the third term, respectively, of a geometric progression whose common ratio is  $r$ .
- (i) Write down two equations connecting  $d$  and  $r$ . Hence show that  $r = \frac{3}{4}$  and find the value of  $d$ . [6]
- (ii) Find the sum to infinity of the geometric progression. [2]
- (iii) Find the sum of the first 8 terms of the arithmetic progression. [2]
- 7 A progression has a second term of 96 and a fourth term of 54. Find the first term of the progression in each of the following cases:
- (i) the progression is arithmetic, [3]
- (ii) the progression is geometric with a positive common ratio. [3]