



Name: \_\_\_\_\_

Date: \_\_\_\_\_

IBSL Year 1

Algebra Test - Paper 1

Score: /39

CAC%:

IB:

### INSTRUCTIONS TO CANDIDATE

- Write your name in the box above.
- Do not open this examination paper until instructed to do so.
- You are not permitted access to any calculator for this paper.
- Section A: answer all questions in the boxes provided.
- Section B: answer all questions in the answer booklet provided. Write your name on the front of the answer booklet turn it in with your examination paper.
- Unless otherwise stated in the question, all numerical answers should be given exactly or correct to three significant figures.
- A clean copy of the *Mathematics SL formula booklet* is required for this paper
- The maximum mark for this examination paper is [39 marks].



Full marks are not necessarily awarded for a correct answer with no working. Answers must be supported by working and/or explanations. Where an answer is incorrect, some marks may be given for a correct method, provided this is shown by written working. You are therefore advised to show all working.

### Section A

Answer **all** questions in the space provided. Working may be continued in the answer booklet.

1. The first three terms of an infinite geometric sequence are 32, 16 and 8.

(a) Write down the value of  $r$ . (1)

(b) Find  $u_6$ . (2)

(c) Find the sum to infinity of this sequence. (2)  
**(Total 5 marks)**

2. Consider the arithmetic sequence 2, 5, 8, 11, ....

(a) Find  $u_{101}$ . (3)

(b) Find the value of  $n$  so that  $u_n = 152$ . (3)  
**(Total 6 marks)**

3. A theatre has 20 rows of seats. There are 15 seats in the first row, 17 seats in the second row, and each successive row of seats has two more seats in it than the previous row.

(a) Calculate the number of seats in the 20<sup>th</sup> row.

(b) Calculate the **total** number of seats.

**(Total 6 marks)**

4. Let  $S_n$  be the sum of the first  $n$  terms of an arithmetic sequence, whose first three terms are  $u_1$ ,  $u_2$  and  $u_3$ . It is known that  $S_1 = 7$ , and  $S_2 = 18$ .

(a) Write down  $u_1$ .

(b) Calculate the common difference of the sequence.

(c) Calculate  $u_4$ .

*Working:*

*Answers:*

(a) .....

(b) .....

(c) .....

**(Total 6 marks)**

5. The following table shows four series of numbers. One of these series is geometric, one of the series is arithmetic and the other two are neither geometric nor arithmetic.

(a) Complete the table by stating the type of series that is shown.

| Series |   | Type of series |
|--------|---|----------------|
| (i)    | $1 + 11 + 111 + 1111 + 11111 + \dots$   |                |
| (ii)   | $1 + \frac{3}{4} + \frac{9}{16} + \frac{27}{64} + \dots$                      |                |
| (iii)  | $0.9 + 0.875 + 0.85 + 0.825 + 0.8 + \dots$                                    |                |
| (iv)   | $\frac{1}{2} + \frac{2}{3} + \frac{3}{4} + \frac{4}{5} + \frac{5}{6} + \dots$ |                |

(b) The geometric series can be summed to infinity. Find this sum.

*Working:*

*Answer:*

(b) .....

**(Total 6 marks)**

6. Find the sum of the arithmetic series

$$17 + 27 + 37 + \dots + 417.$$

*Working:*

*Answer:*

.....

**(Total 4 marks)**

7. Find the coefficient of  $x^3$  in the expansion of  $(2 - x)^5$ .

*Working:*

*Answer:*

.....

**(Total 6 marks)**