



Name: _____

Date: _____

IBSL Year 1

Algebra Test - Paper 2

Score: /38

CAC%:

IB:

INSTRUCTIONS TO CANDIDATES

- Write your name in the box above.
- Do not open this examination paper until instructed to do so.
- A graphic display calculator is required 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 [38 marks].

Full marks are not necessarily awarded for a correct answer with no working. Answers must be supported by working and/or explanations. In particular, solutions found from a graphic display calculator should be supported by suitable working, for example if graphs are used to find a solution, you should sketch these as part of your answer. 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. (a) Expand $\sum_{r=4}^7 2^r$ as the sum of four terms.

(1)

(b) (i) Find the value of $\sum_{r=4}^{30} 2^r$.

(ii) Explain why $\sum_{r=4}^{\infty} 2^r$ cannot be evaluated.

(6)
(Total 7 marks)

2. The constant term in the expansion of $\left(\frac{x}{a} + \frac{a^2}{x}\right)^6$, where $a \in R$ is 1280. Find a .

(Total 7 marks)

Do **NOT** write solutions on this page.

Section B

Answer **all** questions in the answer booklet provided. Please start each question on a new page.

3. The *Acme* insurance company sells two savings plans, Plan A and Plan B.

For Plan A, an investor starts with an initial deposit of \$1000 and increases this by \$80 each month, so that in the second month, the deposit is \$1080, the next month it is \$1160 and so on.

For Plan B, the investor again starts with \$1000 and each month deposits 6% more than the previous month.

- (a) Write down the amount of money invested under Plan B in the second and third months.

(2)

Give your answers to parts (b) and (c) correct to the nearest dollar.

- (b) Find the amount of the 12th deposit for each Plan.

(4)

- (c) Find the total amount of money invested during the first 12 months

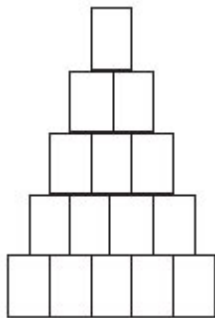
(i) under Plan A;

(ii) under Plan B.

(2)

(Total 10 marks)

4. Clara organizes cans in triangular piles, where each row has one less can than the row below. For example, the pile of 15 cans shown has 5 cans in the bottom row and 4 cans in the row above it.



- (a) A pile has 20 cans in the bottom row. Show that the pile contains 210 cans.

(4)

- (b) There are 3240 cans in a pile. How many cans are in the bottom row?

(4)

- (c) (i) There are S cans and they are organized in a triangular pile with n cans in the bottom row. Show that $n^2 + n - 2S = 0$.

(ii) Clara has 2100 cans. Explain why she cannot organize them in a triangular pile.

(6)

(Total 14 marks)