



Name: _____ Date: _____

IBSL Year 1

Quadratics Test - Paper 2

Score: /28

CAC%:

IB:

INSTRUCTIONS TO CANDIDATES

- Write your session number in the boxes 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.
- 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 [28 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.

1a. [4 marks]

Let $f(x) = 2x^2 - 8x - 9$.

(i) Write down the coordinates of the vertex.

(ii) Hence or otherwise, express the function in the form $f(x) = 2(x - h)^2 + k$.

1b. [3 marks]

Solve the equation $f(x) = 0$.

2. [7 marks]

A farmer wishes to create a rectangular enclosure, ABCD, of area 525 m, as shown below.



The fencing used for side AB costs \$11 per metre. The fencing for the other three sides costs \$3 per metre. The farmer creates an enclosure so that the cost is a minimum. Find this minimum cost.

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.

3a. [5 marks]

A rock falls off the top of a cliff. Let h be its height above ground in metres, after t seconds.

The table below gives values of h and t .

t (seconds)	1	2	3	4	5
h (metres)	105	98	84	60	26

Jane thinks that the function $f(t) = -0.25t^3 - 2.32t^2 + 1.93t + 106$ is a suitable model for the data.

Use Jane's model to:

- (i) write down the height of the cliff;
- (ii) find the height of the rock after 4.5 seconds;
- (iii) find after how many seconds the height of the rock is 30m.

3b. [3 marks]

Kevin thinks that the function $g(t) = -5.2t^2 + 9.5t + 100$ is a better model for the data.

Use Kevin's model to find when the rock hits the ground.

3c. [6 marks]

- (i) On graph paper, using a scale of 1 cm to 1 second, and 1 cm to 10 m, plot the data given in the table.
- (ii) By comparing the graphs of f and g with the plotted data, explain which function is a better model for the height of the falling rock.

Printed for Cairo American College

© International Baccalaureate Organization 2015

International Baccalaureate® - Baccalauréat International® - Bachillerato Internacional®