



Name: _____ Date: _____

IBSL Year 1

Rational Quiz - Paper 2

Score: /14

CAC%:

IB:

INSTRUCTIONS TO CANDIDATE

- Write your name in the boxes 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 [14 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.

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.

1. Let $f(x) = \frac{3x}{x-q}$, where $x \neq q$.

a. [2 marks]

Write down the equations of the vertical and horizontal asymptotes of the graph of f .

b. [2 marks]

The vertical and horizontal asymptotes to the graph of f intersect at the point $Q(1, 3)$.

Find the value of q .

c. [4 marks]

The vertical and horizontal asymptotes to the graph of f intersect at the point $Q(1, 3)$.

The point $P(x, y)$ lies on the graph of f . Show that $PQ = \sqrt{(x-1)^2 + \left(\frac{3}{x-1}\right)^2}$.

d. [6 marks]

The vertical and horizontal asymptotes to the graph of f intersect at the point $Q(1, 3)$.

Hence find the coordinates of the points on the graph of f that are closest to $(1, 3)$.