



CAIRO AMERICAN  
C • O • L • L • E • G • E

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

IBSL Year 1

Date: December 16, 2015

SEMESTER 1 FINAL EXAM  
PAPER 1

Score: /47

CAC%:

IB:

### INSTRUCTIONS TO CANDIDATE

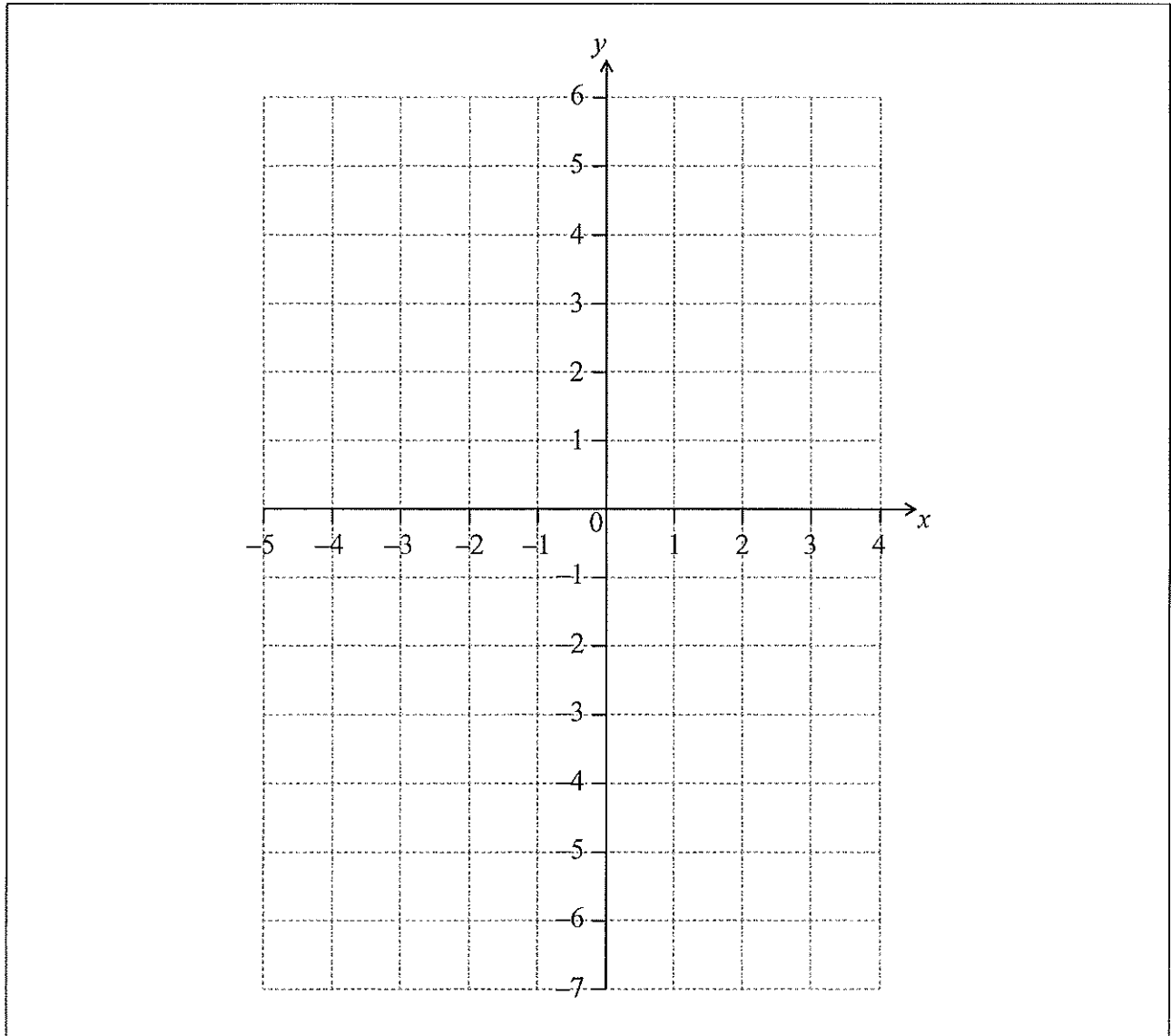
- Write your name in the box above.
- Do not open this examination paper until instructed to do so.
- You are not permitted access to any calculator for this paper.
- Section A: answer all questions in the boxes provided.
- Section B: answer all questions on the answer page(s) provided. Write your name on the top of the answer page(s) and turn 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 [47 marks].



(Question 1 continued)

(c) On the following grid, sketch the graph of  $f$ , for  $-4 \leq x \leq 3$ .

[3]



12EP03

Turn over

2. [Maximum mark: 6]

In an arithmetic sequence, the first term is 2 and the second term is 5.

(a) Find the common difference. [2]

(b) Find the eighth term. [2]

(c) Find the sum of the first eight terms of the sequence. [2]

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12EP04



5. [Maximum mark: 6]

Let  $f(x) = p + \frac{9}{x - q}$ , for  $x \neq q$ . The line  $x = 3$  is a vertical asymptote to the graph of  $f$ .

(a) Write down the value of  $q$ . [1]

The graph of  $f$  has a  $y$ -intercept at  $(0, 4)$ .

(b) Find the value of  $p$ . [4]

(c) Write down the equation of the horizontal asymptote of the graph of  $f$ . [1]

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12EP07

Turn over



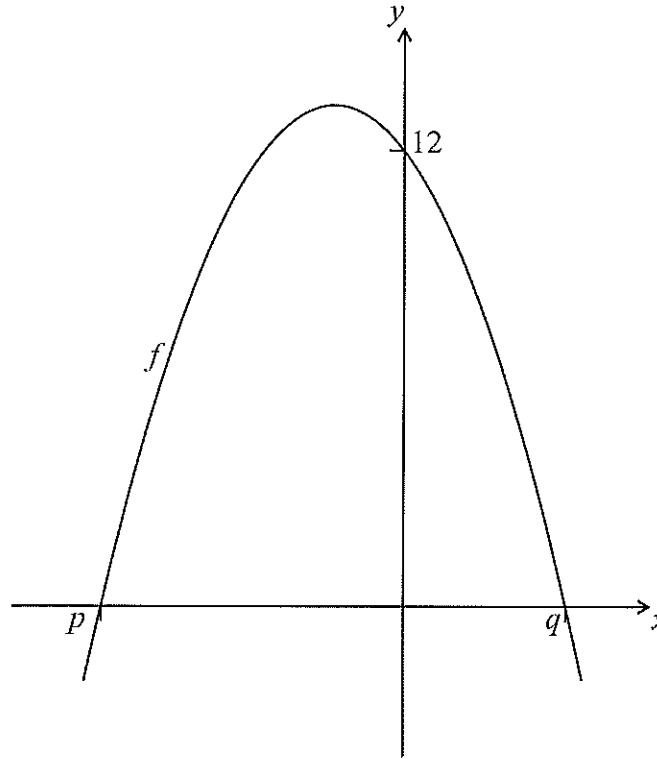
Do **not** write solutions on this page.

## Section B

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

8. [Maximum mark: 15]

Let  $f(x) = a(x + 3)(x - 1)$ . The following diagram shows part of the graph of  $f$ .



The graph has  $x$ -intercepts at  $(p, 0)$  and  $(q, 0)$ , and a  $y$ -intercept at  $(0, 12)$ .

(a) (i) Write down the value of  $p$  and of  $q$ .

(ii) Find the value of  $a$ .

[6]

(b) Find the equation of the axis of symmetry of the graph of  $f$ .

[3]

(c) Find the largest value of  $f$ .

[3]

The function  $f$  can also be written as  $f(x) = a(x - h)^2 + k$ .

(d) Find the value of  $h$  and of  $k$ .

[3]

