

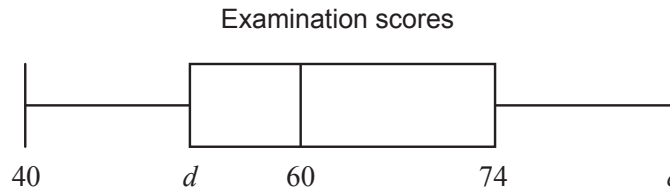
Full marks are not necessarily awarded for a correct answer with no working. Answers must be supported by working and/or explanations. Where an answer is incorrect, some marks may be given for a correct method, provided this is shown by written working. You are therefore advised to show all working.

Section A

Answer **all** questions in the boxes provided. Working may be continued below the lines if necessary.

1. [Maximum mark: 5]

The following box-and-whisker plot represents the examination scores of a group of students.



(a) Write down the median score. [1]

The range of the scores is 47 marks, and the interquartile range is 22 marks.

(b) Find the value of

(i) c ;

(ii) d . [4]

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7. [Maximum mark: 6]

An arithmetic sequence has the first term $\ln a$ and a common difference $\ln 3$.
The 13th term in the sequence is $8 \ln 9$. Find the value of a .

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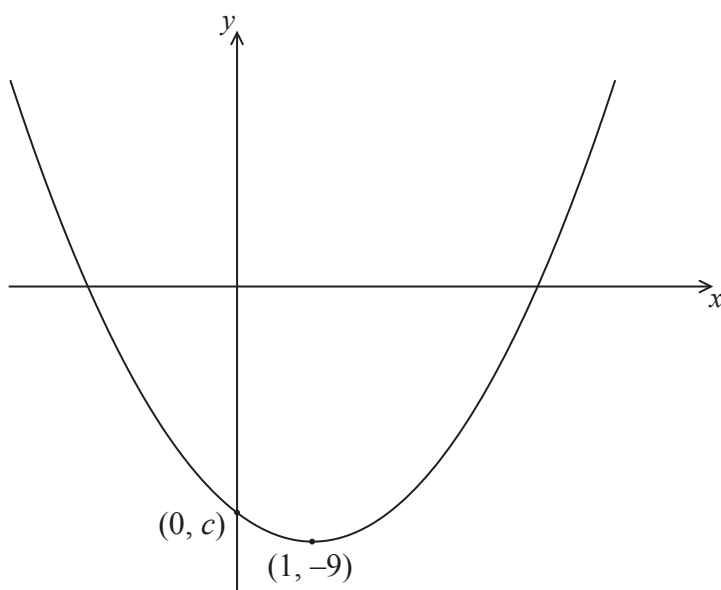
Do **not** write solutions on this page.

Section B

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

8. [Maximum mark: 16]

The following diagram shows part of the graph of a quadratic function f .



The vertex is at $(1, -9)$, and the graph crosses the y -axis at the point $(0, c)$.

The function can be written in the form $f(x) = (x - h)^2 + k$.

(a) Write down the value of h and of k . [2]

(b) Find the value of c . [2]

Let $g(x) = -(x - 3)^2 + 1$. The graph of g is obtained by a reflection of the graph of f in the x -axis, followed by a translation of $\begin{pmatrix} p \\ q \end{pmatrix}$.

(c) Find the value of p and of q . [5]

(d) Find the x -coordinates of the points of intersection of the graphs of f and g . [7]



4. [Maximum mark: 6]

(a) Write down the value of

(i) $\log_3 27$;

(ii) $\log_8 \frac{1}{8}$;

(iii) $\log_{16} 4$.

[3]

(b) Hence, solve $\log_3 27 + \log_8 \frac{1}{8} - \log_{16} 4 = \log_4 x$.

[3]