



Cambridge International AS & A Level

CANDIDATE
NAME



CENTRE
NUMBER

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CANDIDATE
NUMBER

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MATHEMATICS

9709/23

Paper 2 Pure Mathematics 2

October/November 2024

1 hour 15 minutes

You must answer on the question paper.

You will need: List of formulae (MF19)

INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- If additional space is needed, you should use the lined page at the end of this booklet; the question number or numbers must be clearly shown.
- You should use a calculator where appropriate.
- You must show all necessary working clearly; no marks will be given for unsupported answers from a calculator.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.

INFORMATION

- The total mark for this paper is 50.
- The number of marks for each question or part question is shown in brackets [].

This document has **16** pages. Any blank pages are indicated.

(a) Use logarithms to show that the gradient of the straight line is $\frac{3}{2 \ln a}$. [1]

[illegible][illegible]



[4]

This image shows a full page of white paper with horizontal dotted lines, typical of primary school writing paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

(a) Find the exact value of $f'\left(\frac{2}{3}\pi\right)$. [3]

This image shows a full page of white paper with horizontal dashed lines, typical of primary school writing paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



[4]

[illegible]



4 The polynomial $p(x)$ is defined by

$$p(x) = ax^3 - ax^2 - 15x + 18,$$

where a is a constant. It is given that $(x+2)$ is a factor of $p(x)$.

(a) Find the value of a .

[2]

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(b) Hence factorise $p(x)$ completely.

[3]

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[3]

[illegible]

(a) Show that $a = \sqrt[3]{0.5e^{1.4}(2a+1) - 0.5}$. [5]

[illegible]

[illegible]

$$x = \frac{e^{2t} - 2}{e^{2t} + 1}, \quad y = e^{3t} + 1.$$
[illegible]



[3]

[illegible]

This image shows a full page of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page, providing a template for handwriting practice or general writing. There are no margins, text, or other markings on the page.

[illegible]

[illegible]

If you use the following page to complete the answer to any question, the question number must be clearly shown.

This image shows a single page of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



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