



Cambridge International AS & A Level

CANDIDATE
NAME
CENTRE
NUMBER

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FURTHER MATHEMATICS

9231/22

Paper 2 Further Pure Mathematics 2

October/November 2024

2 hours

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 75.
- The number of marks for each question or part question is shown in brackets [].

This document has **20** pages. Any blank pages are indicated.





[4]

[illegible]

2 The curve C has equation

$$4y^2 + 4 \ln(xy) = 1.$$

(a) Show that, at the point $\left(2, \frac{1}{2}\right)$ on C , $\frac{dy}{dx} = -\frac{1}{6}$. [3]

This image shows a full page of a handwriting practice worksheet. It consists of approximately 20 horizontal rows. Each row is defined by two parallel dotted lines, creating a series of uniform gaps for writing. The lines are evenly spaced across the entire page, providing a guide for letter height and placement. There is no text or other markings on the page.



[4]

[illegible]

$$x = \frac{1}{2}e^{2t} - \frac{1}{3}t^3 - \frac{1}{2}, \quad y = 2e^t(t-1), \quad \text{for } 0 \leq t \leq 1.$$

[7]

[illegible]

[illegible]

$$\cot 6\theta = \frac{\cot^6 \theta - 15 \cot^4 \theta + 15 \cot^2 \theta - 1}{6 \cot^5 \theta - 20 \cot^3 \theta + 6 \cot \theta}. \quad [6]$$
[illegible]



in the form $\cot(q\pi)$, where q is a rational number. [4]

This image shows a full page of a worksheet designed for handwriting practice. It features approximately 20 horizontal rows, each defined by two parallel dotted lines. The lines are evenly spaced and extend across the entire width of the page, providing a guide for letter height and placement. There is no text or other markings on the page.

$$3\frac{d^2y}{dx^2} + 2\frac{dy}{dx} + y = x^2,$$

[10]

This image shows a full page of primary-ruled paper. It features multiple sets of horizontal dashed lines spaced evenly down the page, providing a guide for handwriting practice. The background is white, and there are no margins or other markings present.

[illegible]

[illegible][illegible]

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- This image shows a full page of primary-ruled paper. It contains ten identical sets of horizontal lines spaced evenly down the page. Each set is composed of three lines: a solid top line, a dashed midline, and a solid bottom line, providing a guide for letter height and placement in handwriting practice.

- [illegible]



for which $y = 5$ when $x = \ln 2$. Give your answer in an exact form. [7]

This image shows a full page of a handwriting practice worksheet. It consists of approximately 20 horizontal rows. Each row is defined by two parallel dotted lines, creating a series of uniform gaps for writing. The lines are evenly spaced across the entire page, providing a guide for letter height and placement. There is no text or other markings on the page.

$$\mathbf{A} = \begin{pmatrix} -2 & 0 & 0 \\ 0 & 7 & 9 \\ 4 & 1 & 7 \end{pmatrix}.$$

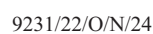
-
- This image shows a full page of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page, typical of notebook or legal stationery. There are no margins, text, or other markings on the page.



where p , q and r are integers to be determined. [4]

This image shows a full page of a worksheet designed for handwriting practice. It consists of approximately 20 horizontal rows. Each row is defined by two parallel dotted lines, creating a series of uniform gaps where letters can be formed. The lines are evenly spaced across the entire page, providing a guide for letter height and placement. There is no text or other markings on the page.

This image shows a full page of a document template designed for handwriting practice or general note-taking. It consists of approximately 28 evenly spaced horizontal dotted lines across the entire width of the page. The background is plain white, and there are no margins, headers, footers, or other markings present.





1

[illegible]



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