



Cambridge International AS & A Level

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NAME
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MATHEMATICS**9709/21**

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]

[illegible]

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

[illegible]



[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]

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- This image shows a full page of primary-ruled paper. It features approximately 20 horizontal dotted lines spaced evenly down the page, providing a guide for handwriting practice. The paper is otherwise blank, with no margins, text, or other markings.

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

This image shows a full page of white paper with horizontal dashed lines, typical of primary-ruled notebook 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.



[3]

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.

[illegible][illegible]



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(c) Show that the exact value of $\cos 20^\circ \cos 50^\circ + \cos 40^\circ \cos 70^\circ$ is $\frac{1}{2}\sqrt{3}$. [3]

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

[illegible]



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