



Cambridge International AS & A Level

CANDIDATE
NAME
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MATHEMATICS**9709/32**

Paper 3 Pure Mathematics 3

February/March 2025**1 hour 50 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 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.



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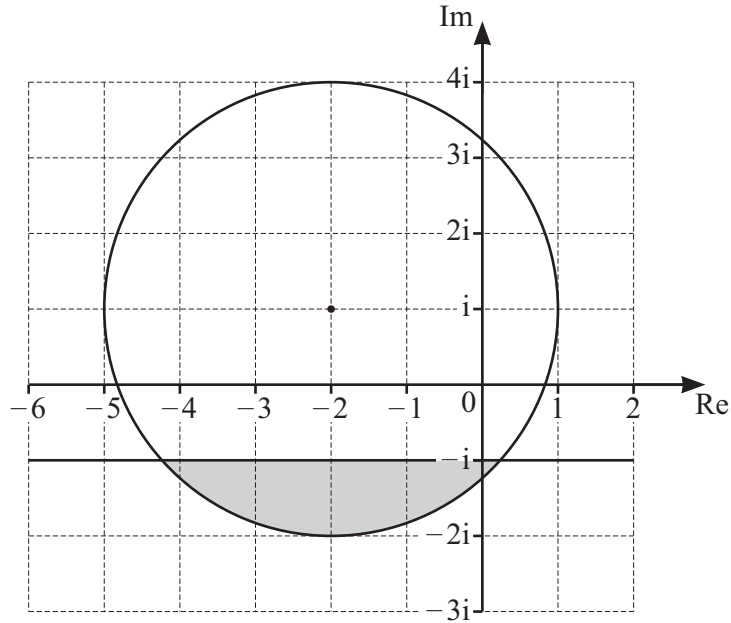

$$\ln(1 - e^{-2x}) + 3 = 0.$$

[3]

[illegible]

- Find the gradient of the curve at the point where $x = 0$.

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.



The shaded region on the Argand diagram shows points representing complex numbers z defined by two inequalities. The shaded region is bounded by a circle and a line parallel to the real axis. The boundaries of the region are included in the shaded region.

- (a) Find two inequalities in terms of z that define the shaded region. [3]

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- (b) Find the greatest value of $|z|$ for points in this region. [3]

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- This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the page.

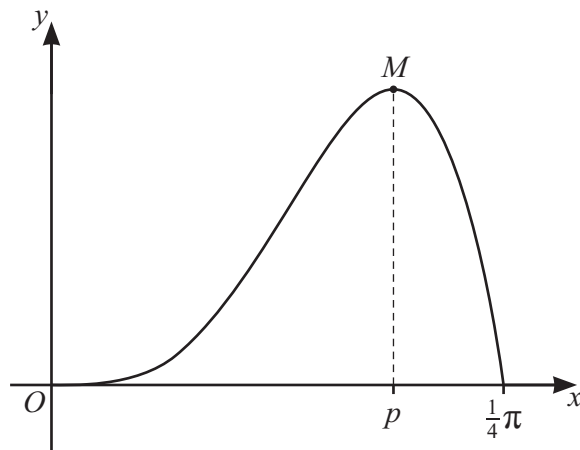
- By first forming a quartic equation in x or y , find the square roots of $-4+6\sqrt{5}i$ in exact Cartesian form. [5]

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.


$$\frac{dx}{d\theta} = \left(\frac{1}{5}x + 1\right) \sin^2 2\theta,$$

Solve the differential equation and obtain an expression for x in terms of θ . [7]

[illegible]



The diagram shows the curve $y = x^3 \cos 2x$ for $0 \leq x \leq \frac{1}{4}\pi$. The curve has a maximum point at M , where $x = p$.

- (a)** Show that p satisfies the equation $p = \frac{1}{2} \tan^{-1} \left(\frac{3}{2p} \right)$. [3]

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



(b) Show by calculation that $0.5 < p < 0.7$.

[2]

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(c) Use an iterative formula based on the equation in part (a) to calculate p correct to 3 decimal places. Give the result of each iteration to 5 decimal places. [3]

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[3]

This image shows a full page of a worksheet designed for handwriting practice. It features approximately 20 evenly spaced horizontal dotted lines across the entire page, providing a guide for letter height and placement. The background is plain white, and there are no other markings or text present.

- [illegible]



[3]

This image shows a full page of a handwriting practice worksheet. It consists of multiple sets of three horizontal dashed lines, providing a guide for letter height and placement. The lines are evenly spaced across the entire page, which is otherwise blank white space.

[2]

[illegible]

10 Let $f(x) = \frac{-7x^2 + 2x - 6}{(1+x)(4+x^2)}$.

[5]

[illegible]

[illegible]

11 Find the exact value of $\int_0^\pi x^2 \cos \frac{1}{3}x \, dx$.

[6]

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[illegible]

[illegible]

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