



Cambridge International AS & A Level

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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.




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

Give your final answer correct to 4 decimal places.

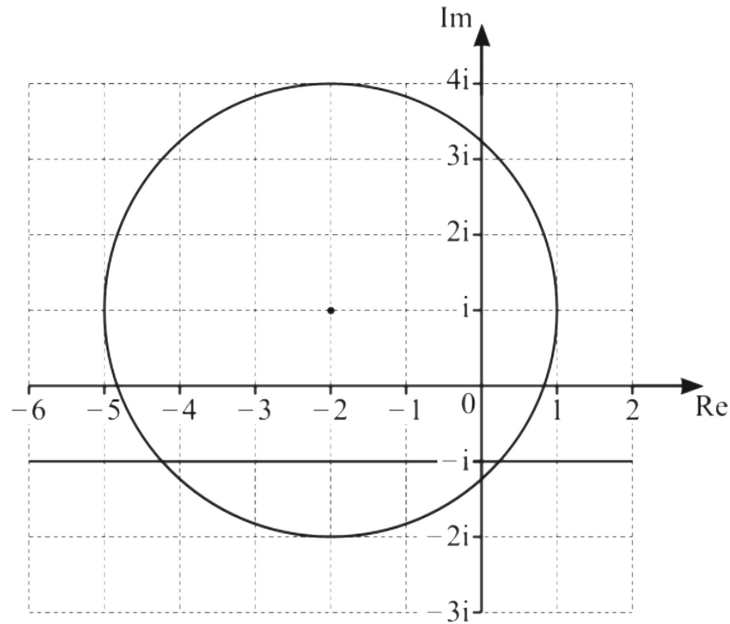
[3]

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

[5]

[illegible]



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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- 4 By first expressing the equation $\tan(x-60^\circ) = 2 \cot x$ as a quadratic equation in $\tan x$, solve the equation for $0^\circ \leq x \leq 180^\circ$. [6]

[illegible]

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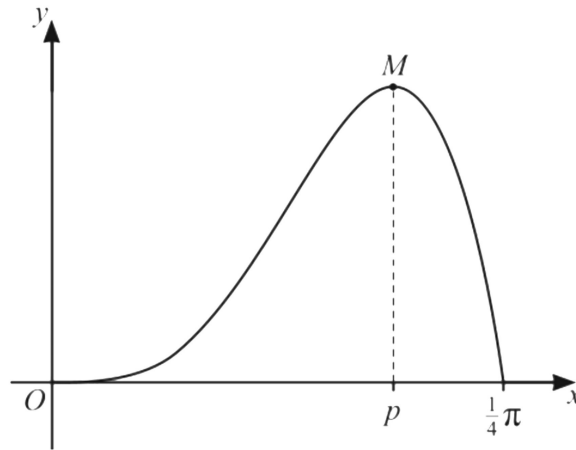
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$$\frac{dx}{d\theta} = \left(\frac{1}{5}x + 1\right) \sin^2 2\theta,$$

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]

[illegible]



(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]

[illegible]

[2]

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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]

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