



Cambridge International AS & A Level

CANDIDATE NAME



CENTRE NUMBER

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CANDIDATE NUMBER

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MATHEMATICS

9709/32

Paper 3 Pure Mathematics 3

October/November 2025

1 hour 50 minutes

You must answer on the question paper.

You will need: List of formulae (MF19)

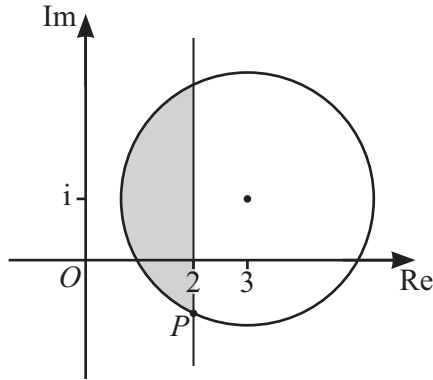
INSTRUCTIONS

- 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.



The shaded region in the Argand diagram, bounded by a line and a circle, represents the complex numbers z satisfying

$$\text{Re } z \leq 2 \text{ and } |z - (3 + i)| \leq 2.$$

The point P shown on the diagram is one of the points of intersection of the line and the circle.

- (a) Find the complex number represented by the point P . Give your answer in the form $x + iy$, where x and y are real and exact. [2]

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- (b) Find the greatest value of $\arg z$ for points in the shaded region. [3]

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4 Find the exact value of $\int_0^1 x \tan^{-1} x \, dx$.

[6]

Handwriting practice area consisting of multiple horizontal dotted lines for writing the solution.

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- 6 (a) By sketching a suitable pair of graphs, show that the equation $\cot 2x = 2 \sin 2x - 1$ has exactly one root in the interval $0 < x < \frac{1}{2}\pi$. [2]

- (b) Show by calculation that the root is in the interval $0.4 < x < 0.6$. [2]

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- (c) Use the iterative formula $x_{n+1} = \frac{1}{2} \tan^{-1} \left(\frac{1}{2 \sin 2x_n - 1} \right)$ to calculate the root correct to 2 decimal places. Give the result of each iteration to 4 decimal places. [3]

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7 The equation of a curve is $2y^3 - 3x^2y - x^3 = 16$.

(a) Show that $\frac{dy}{dx} = \frac{x^2 + 2xy}{2y^2 - x^2}$. [4]

Dotted lines for writing the answer.

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(b) Hence find the exact value of $\int_{-a}^a f(x) dx$. Give your answer in the form $a(p + \ln q)$, where p and q are rational. [4]

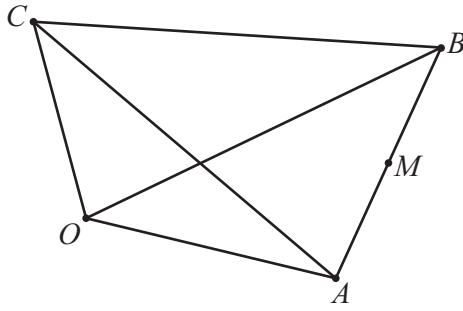
Handwriting practice lines (dotted lines) for the answer.

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Relative to the origin O , the position vectors of the points A , B and C are

$$\vec{OA} = 4\mathbf{i} - 2\mathbf{j}, \vec{OB} = 2\mathbf{i} + 8\mathbf{j} + 4\mathbf{k}, \text{ and } \vec{OC} = -2\mathbf{i} + 6\mathbf{k}.$$

The midpoint of AB is M , as shown in the diagram.

- (a) Find the vectors \vec{MB} and \vec{MC} . [2]

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- (b) Calculate the exact value of the cosine of angle CMB . [3]

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