



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.

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

[5]

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.

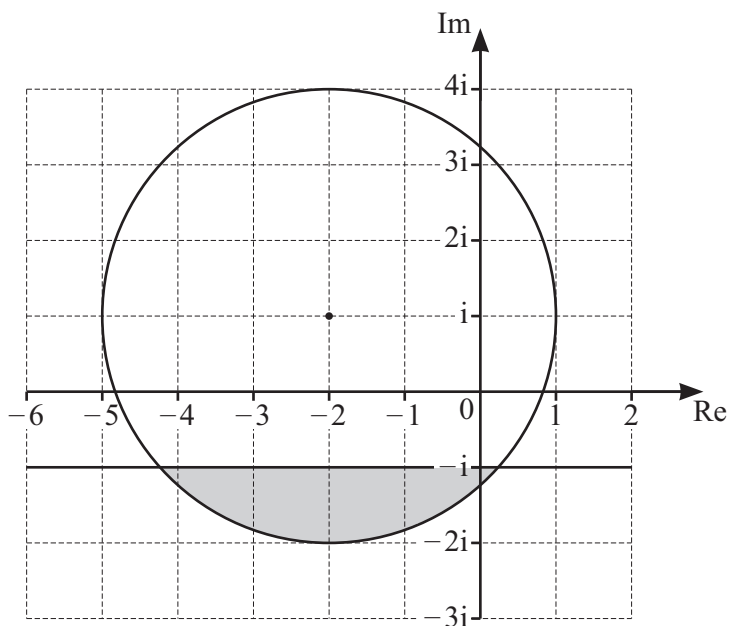
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Handwriting practice area with 20 sets of dotted lines.





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]

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6 The variables x and θ satisfy the differential equation

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

and $x = 5$ when $\theta = 0$.

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

[7]

[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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(a) Show that the lines are skew.

[5]

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(b) Find the obtuse angle between the directions of the two lines.

[3]

This image shows a full page of white paper with horizontal dashed lines, typical of primary school handwriting practice paper. The lines are evenly spaced and run across the entire width of the page. There are no margins, text, or other markings present.



- (a)** Find the values of a and b .

[5]

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(b) When a and b have the values found in part **(a)**, factorise $p(x)$ completely.

[3]

(c) Hence solve the inequality $p(x) < 0$.

[2]





(a) Express $f(x)$ in partial fractions.

[5]

This image shows a full page of a document template designed for handwriting practice or as a general writing guide. It consists of approximately 20 evenly spaced, horizontal dotted lines running across the entire width of the page. The background is plain white, and there are no margins, headers, footers, or other markings present.



- (b)** Hence find the exact value of $\int_0^2 f(x) dx$. Give your answer in the form $a\pi - \ln b$, where a and b are constants. [6]

[illegible]



[6]

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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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