



Cambridge International AS & A Level

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MATHEMATICS**9709/35**

Paper 3 Pure Mathematics 3

May/June 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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1 Solve the equation $3^{4-2x} = 5(6^{x-1})$. Give your answer correct to 3 significant figures. [4]

[illegible]



[5]

[illegible]



3 The complex numbers s and t are given by

$$s = 5(\cos 0.25 + i \sin 0.25) \quad \text{and} \quad t = 6e^{3i}.$$

- (a) Express $\frac{s}{t}$ in the form $re^{i\theta}$, where $-\pi < \theta \leq \pi$ and $r > 0$. [2]

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- (b) In an Argand diagram with origin O , the points A and B represent the complex numbers s and $\frac{s}{t}$ respectively.

By considering the line segments OA and OB , or otherwise, state the two geometric effects of dividing a complex number by $6e^{3i}$. [2]

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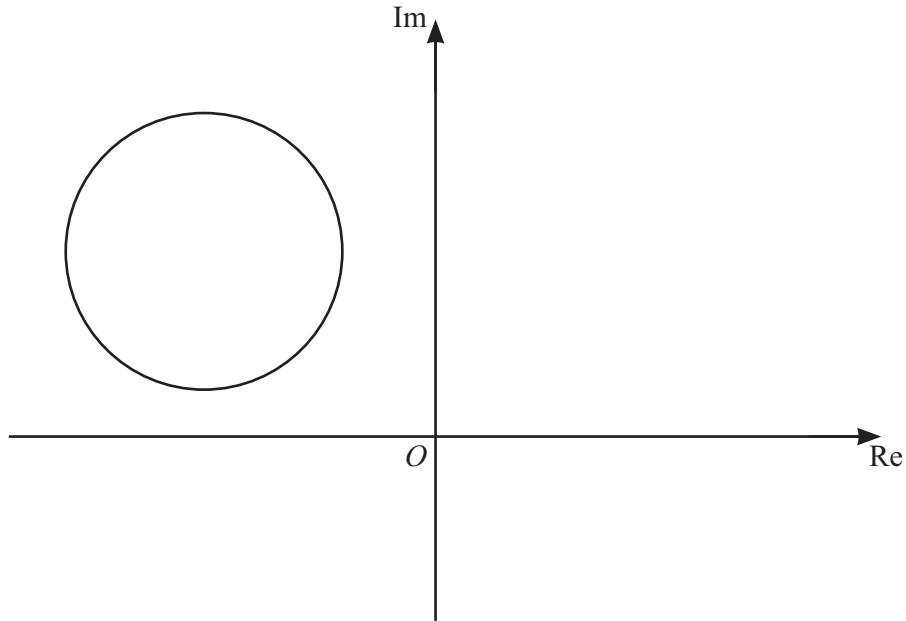
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The diagram shows the locus of points representing the complex numbers, z , satisfying $|z + 5 - 4i| = 3$.

- (a) For the points on this locus, determine the maximum and minimum possible values of $|z|$. [3]

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- (b) For the points on this locus, determine the minimum possible value of $\arg z$. [3]

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- (b)** Find an equation of the normal to the curve at the point where $t = \frac{1}{12}\pi$. Give your answer in the form $y = mx + c$, where the constants m and c are exact. [4]

[illegible]



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[3]

[illegible]

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(b) Find the exact value of $\int_0^{0.25} y \, dx$.

[5]

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(c) Show that, if a sequence of real values given by the iterative formula

$$x_{n+1} = \frac{1}{2} \cos^{-1} \left(\frac{-2}{4x_n + 1} \right)$$

converges, then it converges to the root of the equation in part (a).

[2]

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(d) Use this iterative formula to calculate this root correct to 3 decimal places. Give the result of each iteration to 5 decimal places.

[3]

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[5]

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- (b) Hence obtain the expansion of $\frac{12x^2+55x-2}{(3x-2)(x+6)}$ in ascending powers of x , up to and including the term in x^2 . [4]

[illegible]



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[3]

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(b) A, B, C and D are the vertices of a rhombus.

Find the position vector of D .

[2]

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(c) Calculate angle ABC .

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