



Cambridge International AS & A Level

CANDIDATE NAME



CENTRE NUMBER

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MATHEMATICS

9709/33

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.



5 The equation of a curve is $xy + y^2 e^{-x} = 4$.



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

Dotted lines for working out the derivative.

(b) Find the gradients of the tangents to the curve when $x = 0$. [2]

Dotted lines for working out the gradients.

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8 (a) Prove the identity $\cot^2 \theta - \tan^2 \theta \equiv 4 \cot 2\theta \operatorname{cosec} 2\theta$. [4]



Dotted lines for writing the proof.

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