

# Cambridge International AS & A Level

CANDIDATE NAME					
CENTRE NUMBER			CANDIDATE NUMBER		

MATHEMATICS 9709/22

Paper 2 Pure Mathematics 2

May/June 2024

1 hour 15 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**

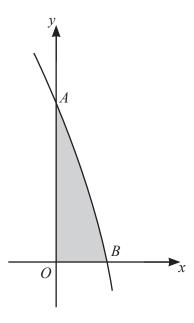
- The total mark for this paper is 50.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **16** pages. Any blank pages are indicated.

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est regardants to sorve the equation of	= $5e^{3x+2}$ . Give your answer correct to 4 significant figures [4]

3



The diagram shows the curve with equation  $y = 8e^{-x} - e^{2x}$ . The curve crosses the y-axis at the point A and the x-axis at the point B. The shaded region is bounded by the curve and the two axes.

Find the gradient of the curve at A.	[3]
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$$x = 4\cos^2 t, \qquad y = \sqrt{3}\sin 2t,$$

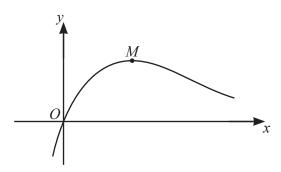
for values of t such that  $0 < t < \frac{1}{2}\pi$ .

Find the equation of the normal to the curve at the point for which $t = \frac{1}{6}\pi$ . Give your answer in the form $ax + by + c = 0$ where $a$ , $b$ and $c$ are integers.


Find the quotient when $p(x)$ is divided by $(3x+2)$ , and show that the remainder is 6.

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6



The diagram shows the curve with equation  $y = \frac{\ln(2x+1)}{x+3}$ . The curve has a maximum point M.

(a)	Find an expression for	$\frac{\mathrm{d}y}{\mathrm{d}x}$ .		[2]
(b)	Show that the <i>x</i> -coordi	nate of $M$ satisfies the equation $M$	ation $x = \frac{x+3}{\ln(2x+1)} - 0.5$ .	[2]

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) 5	Solve the equation $\tan^2 \theta + 7 \sin \theta \csc 2\theta = 8$ for $-\pi < \theta < \pi$ .	
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$\Gamma = 1 \int \Omega \cdot 21 \dots 2 \cdot 1$
Find $\int 8\sin^2 \frac{1}{2}x \csc^2 x  dx.$

## Additional page

If you use the following page to complete the answer to any question, the question number must be clearly shown.

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