

Cambridge International AS & A Level

CANDIDATE NAME					
CENTRE NUMBER			CANDIDATE NUMBER		

MATHEMATICS 9709/21

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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3	(a)	Sketch on the same diagram the graphs of $y = 3x - 8 $ and $y = 5 - x$.	[2]

)	Solve the inequality $ 3x-8 < 5-x$.	[4]

(c)	Hence determine the largest integer N satisfying the inequality $ 3e^{0.1N} - 8 < 5 - e^{0.1N}$. [2]

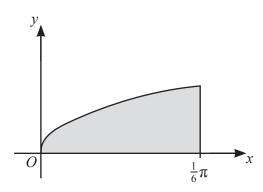
l	(a)	Show that $3 \tan 2\theta + \tan(\theta + 45^\circ) =$	$\tan^2\theta + 8\tan\theta + 1$	[4]
r	(a)	Show that $3 \tan 2\theta + \tan(\theta + 45^\circ) \equiv$	$1-\tan^2\theta$	[ד]
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(b)	Hence solve the equation $3 \tan 2\theta + \tan(\theta + 45^{\circ}) = 4$ for $0^{\circ} < \theta < 180^{\circ}$.	[3]
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The diagram shows the curve with equation $y = \sqrt{\sin 2x + \sin^2 2x}$ for $0 \le x \le \frac{1}{6}\pi$. The shaded region is bounded by the curve and the straight lines $x = \frac{1}{6}\pi$ and y = 0.

G	Is the trapezium rule with two intervals to find an approximation to the area of the shaded regive your answer correct to 2 significant figures.
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Find the exact volume of the solid produced.	

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$$p(x) = 9x^3 + 6x^2 + 12x + k,$$

where k is a constant.

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	is given that $\int_{1}^{\infty} \frac{1}{3x+2} dx = a + \ln 64$, where a is an integer. Indeed, where a is an integer.	
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Additional page

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