

Cambridge International AS & A Level

CANDIDATE NAME			
CENTRE NUMBER		CANDIDATE NUMBER	
MATHEMATICS			9709/2
Paper 2 Pure Mathematics 2			May/June 202
			1 hour 15 minute
You must answer on th	ne 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 **12** pages.

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1	(a)	Solve the equation $ln(2 + x) - ln x = 2 ln 3$.	[3]
			•••••
			•••••
	(b)	Hence solve the equation $\ln(2 + \cot y) - \ln(\cot y) = 2 \ln 3$ for $0 < y < \frac{1}{2}\pi$. Give your a to 4 significant figures.	nnswer correct
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The solutions of the equation $5 x = 5 - 2x$ are $x = a$ and $x = b$, where $a < b$.		
Find the value of $ 3a - 1 + 7b - 1 $.	[5]	
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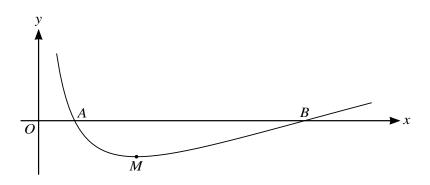
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Solve the equation $\sin(2\theta + 30^\circ) = 5\cos(2\theta + 60^\circ)$ for $0^\circ < \theta < 180^\circ$.	[6]
	••••••

4	(a)	Find the exact value of $\int_0^2 6e^{2x+1} dx$.	[3]
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	(L.)	Γ : $1 \left(\left(\begin{array}{cccccccccccccccccccccccccccccccccccc$	[5]
	(b)	Find $\int (\tan^2 x + 4\sin^2 2x) \mathrm{d}x.$	[5]
			••••••
			•••••

5	(a)	Find the quotient when $x^4 - 32x + 55$ is divided by $(x - 2)^2$ and show that the remainder is 7.

(b)	Factorise $x^4 - 32x + 48$.	[2]
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(c)	Hence solve the equation $e^{-12y} - 32e^{-3y} + 48 = 0$, giving your answer in an exact form.	[2]



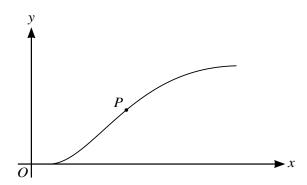
The diagram shows the curve with equation

$$y = (\ln x)^2 - 2\ln x.$$

The curve crosses the x-axis at the points A and B, and has a minimum point M.

(a)	Find the exact value of the gradient of the curve at each of the points A and B .	[6]
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(b)	Find the exact x -coordinate of M .	[2]
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The diagram shows the curve with parametric equations

$$x = 4t + e^{2t}, \qquad y = 6t \sin 2t,$$

for $0 \le t \le 1$. The point *P* on the curve has parameter *p* and *y*-coordinate 3.

(a)	Show that $p = \frac{1}{2\sin 2p}$.
(b)	Show by calculation that the value of p lies between 0.5 and 0.6. [2]
(c)	Use an iterative formula, based on the equation in part (a) , to find the value of p correct to 3 significant figures. Use an initial value of 0.55 and give the result of each iteration to 5 significant figures.

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(4)	Find the gradient of the curve at <i>P</i> .	[5]
(u)	I ma the gradient of the curve at I.	[2]
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Additional Page

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