Cambridge International AS & A Level

CENTRE NUMBER		CANDIDATE NUMBER	
MATHEMATI	cs		9709/22
Paper 2 Pure	Mathematics 2	AH	February/March 2022

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 12 pages.

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	Find the equation of the tangent to the curve at the point $(-2, 7)$, giving your answer in the $y = mx + c$.
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3

	Find the value of a correct to 3 significant figures.
)	Hence find the value of x when $y = 36$. Give your answer correct to 3 significant figures. [



4	(a)	Show that $\sin 2\theta \cot \theta - \cos 2\theta \equiv 1$.	[3]
			••••••
	(b)	Hence find the exact value of $\sin \frac{1}{6}\pi \cot \frac{1}{12}\pi$.	[2]
			,
	(c)	Find the smallest positive value of θ (in radians) satisfying the equation $\sin 2\theta \cot \theta - 3\cos 2\theta = 1.$	[2]
		Sin 20 cot 0 - 3 cos 20 - 1.	[2]
			AHEAD



	Given that $y = \tan^2 x$, show that $\frac{dy}{dx} = 2 \tan x + 2 \tan^3 x$.	
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(b)	Find the exact value of $\int_{\frac{1}{4}\pi}^{\frac{1}{3}\pi} (\tan x + \tan^2 x + \tan^3 x) dx.$	
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	6	The po	lynomial	p(x)	is (defined	by
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$$p(x) = 4x^3 + 16x^2 + 9x - 15.$$

(a)	Find the quotient when $p(x)$ is divided by $(2x + 3)$, and show that the remainder is -6 . [3]
(b)	Find $\int \frac{p(x)}{2x+3} dx.$ [2]
	NHEAD
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(c)	Factorise $p(x) + 6$ completely and hence solve the equation
	$p(\csc 2\theta) + 6 = 0$

for $0^{\circ} < \theta < 135^{\circ}$.	[5]
	HEAD



7	A curve has	equation	$e^{2x}v$	$-e^y =$: 100.
,	11 Cui ve mus	equation	\sim γ	· -	100

Show that $\frac{dy}{dx} = \frac{2e^{2x}y}{e^y - e^{2x}}$.	[3]
Show that the curve has no stationary points.	[2



It is required to find the x-coordinate of P, the point on the curve at which the tangent is parallel to the y-axis.

	$x = \ln 10 - \frac{1}{2} \ln(2x - 1).$	ı
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Additional Page

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