

## Cambridge International AS & A Level

CANDIDATE NAME					
CENTRE NUMBER			CANDIDATE NUMBER		

MATHEMATICS 9709/02

Paper 2 Pure Mathematics 2

For examination from 2020

SPECIMEN PAPER

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 14 pages. Blank pages are indicated.

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	Find the value of <i>a</i> .	[2]
<b>b</b> )	When $a$ has this value, find the remainder when $p(x)$ is divided by $(x + 3)$ .	[2]
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3 It is given that a is a positive constant.
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(a) (i)	Sketch on a single diagram the graphs of $y =  2x - 3a $ and $y =  2x + 4a $ .	[2]
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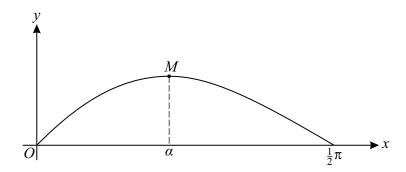
(ii) State the coordinates of each of the points where each graph meets an axis. [1]

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	olve the equation $5^{2x} + 5^x = 12$ , giving your answer correct to 3 significant figures.
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Express $y$ in terms of $x$ , in a form not involving logarithms.	
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The diagram shows the curve  $y = \frac{\sin 2x}{x+2}$  for  $0 \le x \le \frac{1}{2}\pi$ . The *x*-coordinate of the maximum point *M* is denoted by  $\alpha$ .

(a)	Find $\frac{dy}{dx}$ and show that $\alpha$ satisfies the equation $\tan 2x = 2x + 4$ .	[4]
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(6)	Show by calculation that $\alpha$ lies between 0.6 and 0.7.	[2]
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(c)	Use the iterative formula $x_{n+1} = \frac{1}{2} \tan^{-1}(2x_n + 4)$ to find the value of $\alpha$ correct to 3 decimal places.	es. [3]
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6	The parametric equations of a curve are	$c=e^{2t}$ ,	$y = 4te^{t}$

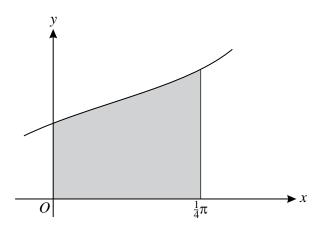
(a)	Show that $\frac{dy}{dx} = \frac{2(t+1)}{e^t}$ .	[4]

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$\int_0^{\frac{1}{4}\pi} (\tan^2 x + \cos^2 x)  \mathrm{d}x.$	[7]
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**(b)** 



The region enclosed by the curve  $y = \tan x + \cos x$  and the lines x = 0,  $x = \frac{1}{4}\pi$  and y = 0 is shown in the diagram.

x-axis.	gion is rotated completely about the [4]

## **Additional page**

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

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