

Cambridge International AS & A Level

CANDIDATE NAME					
CENTRE NUMBER			CANDIDATE NUMBER		

MATHEMATICS 9709/22

Paper 2 Pure Mathematics 2

February/March 2020

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 12 pages. Blank pages are indicated.

2 (a)	Find the quotient when $4x^3 + 17x^2 + 9x$ is divided by $x^2 + 5x + 6$, and show that the remains 18.	inder [3]
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(b)	Hence solve the equation $4x^3 + 17x^2 + 9x - 18 = 0$.	[3]
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3 It is given that \int_a^3	$\frac{2}{2x - 5} \mathrm{d}x = \ln \frac{7}{2}.$
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Find the value of the positive constant <i>a</i> .	[6]
	•••••

4 A curve has equation	on
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$3x^2 - y^2 - 4\ln(2y + 3) = 26.$						
Find the equation of the tangent to the curve at the point $(3, -1)$.	[6]					
	••••••					

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constant.

(a) Sketch, on the same diagram, the graphs of y = |x + 2k| and y = |2x - 3k|, where k is a positive

	Give, in terms of k , the coordinates of the points where each graph meets the axes.	[3]
(b)	Find, in terms of k , the coordinates of each of the two points where the graphs intersect.	[4]
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(c)	Find, in terms of k , the largest value of t satisfying the inequality	
	$ 2^{t} + 2k \ge 2^{t+1} - 3k .$ [2]	.]
		••

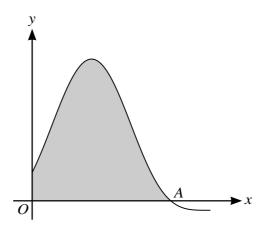
A curve has equation $y = x^3 e^{0.2x}$ where $x \ge 0$. At the point P on the curve, the gradient of the curve

(a)	Show that the <i>x</i> -coordinate of <i>P</i> satisfies the equation $x = \sqrt{\frac{75e^{-0.2x}}{15 + x}}$.	[4]
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The diagram shows part of the curve with equation

$$y = 4\sin^2 x + 8\sin x + 3,$$

where x is measured in radians. The curve crosses the x-axis at the point A and the shaded region is bounded by the curve and the lines x = 0 and y = 0.

(a)	Find the exact x -coordinate of A .	[2]
(b)	Find the exact gradient of the curve at A.	[3]

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(c)	Find the exact area of the shaded region.	[5]

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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