



## **Cambridge Assessment International Education**

Cambridge International Advanced Subsidiary Level

CANDIDATE NAME			
CENTRE NUMBER		CANDIDATE NUMBER	
MATHEMATICS			9709/21
Paper 2 Pure Mathe	matics 2 (P2)	Octo	ber/November 2019
			1 hour 15 minutes
Candidates answer of	n the Question Paper.		
Additional Materials:	List of Formulae (MF9)		

## **READ THESE INSTRUCTIONS FIRST**

Write your centre number, candidate number and name in the spaces at the top of this page.

Write in dark blue or black pen.

You may use an HB pencil for any diagrams or graphs.

Do not use staples, paper clips, glue or correction fluid.

DO NOT WRITE IN ANY BARCODES.

Answer **all** the questions in the space provided. If additional space is required, you should use the lined page at the end of this booklet. The question number(s) must be clearly shown.

Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.

The use of an electronic calculator is expected, where appropriate.

You are reminded of the need for clear presentation in your answers.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

The total number of marks for this paper is 50.



ii)	Hence find the largest integer $n$ satisfying the inequality $ 2 \ln n - 7  <  2 \ln n - 9 $ .
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ii)	
(ii)	
(ii)	
ii)	

Find the exact value of $\int_{1}^{2} (2e^{2x} - 1)^{2} dx$ . Show all necessary working.	

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4	The po	olynomia	1 p(x)	is	defined	by

$$p(x) = ax^3 + ax^2 - 15x - 18,$$

where a is a constant. It is given that (x-2) is a factor of p(x).

(i)	Find the value of $a$ .	[2]
(ii)	Using this value of $a$ , factorise $p(x)$ completely.	[3]
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(iii)	Hence solve the equation $p(e^{\sqrt{y}}) = 0$ , giving the answer correct to 2 significant figures.	[2]
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Come the eq	uation in part (i), show by calculation that 0.5	0 \ u \ 0.13.
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6	(a)	Showing all ne	cessary working,	solve the equation

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for $0^{\circ} < \alpha < 90^{\circ}$ .	[5]
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<b>(b)</b>	Showing all necessary working, solve the equation
	$\sin(\beta + 20^\circ) + \sin(\beta - 20^\circ) = 6\cos\beta$
	for $0^{\circ} < \beta < 90^{\circ}$ . [4]

7	The	equation of a curve is $x^2 - 4xy - 2y^2 = 1$ .
	<b>(i)</b>	Find an expression for $\frac{dy}{dx}$ and show that the gradient of the curve at the point $(-1, 2)$ is $-\frac{5}{2}$ . [5]

(ii)	Show that the curve has no stationary points.	[3]
(iii)	Find the <i>x</i> -coordinate of each of the points on the curve at which the tangent i <i>y</i> -axis.	s parallel to the [2]

## **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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