



# Cambridge International AS & A Level

CANDIDATE  
NAME
CENTRE  
NUMBER

|  |  |  |  |  |
|--|--|--|--|--|
|  |  |  |  |  |
|--|--|--|--|--|

CANDIDATE  
NUMBER

|  |  |  |  |
|--|--|--|--|
|  |  |  |  |
|--|--|--|--|

## MATHEMATICS

9709/22

Paper 2 Pure Mathematics 2

February/March 2025

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.

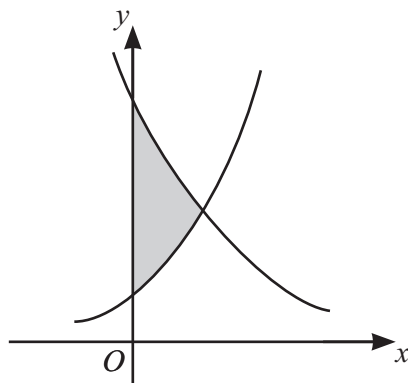
[illegible]



- Find the equation of the curve.

[3]

[illegible]



The diagram shows the curves  $y = e^{2x}$  and  $y = 8e^{-x}$ . The shaded region is bounded by the two curves and the  $y$ -axis.

- (a) Show that the  $x$ -coordinate of the point of intersection of the two curves is  $\ln 2$ . [2]

[illegible]

- (b)** Find the area of the shaded region. [3]

[illegible]



**(a)** Find  $\frac{dy}{dx}$ . [2]

**(a)** Find  $\frac{dy}{dx}$ . [2]

(b) Hence find the coordinates of the stationary points of the curve. [4]

(b) Hence find the coordinates of the stationary points of the curve. [4]



- 5 (a) Sketch on the same diagram the graphs of  $y = |2x - 3|$  and  $y = \ln(x + 1)$ . [2]

The  $x$ -coordinates of the points where the graphs intersect are denoted by  $\alpha$  and  $\beta$ , where  $\alpha < \beta$ .

- (b) Show that  $\alpha = 1.5 - 0.5 \ln(\alpha + 1)$ . [1]

.....

.....

.....

- (c) Use an iterative formula, based on the equation in part (b), to find the value of  $\alpha$  correct to 3 significant figures. Give the result of each iteration to 5 significant figures. [3]

.....

.....

.....

.....

.....

.....

- (d) Show by calculation that  $2.055 < \beta < 2.065$ . [2]

.....

.....

.....

.....

.....

.....



[illegible]

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

- [illegible]



[4]

$$(3 \sin 4\beta - 2 \cos 4\beta)^2 + 15$$
[illegible]

8

(a)

[illegible]



[3]

This image shows a full page of a handwriting practice worksheet. It consists of approximately 20 horizontal rows. Each row is defined by two parallel dotted lines, creating a series of uniform gaps for letter height. The entire page is otherwise blank, with no margins, text, or other markings.

This image shows a full page of a handwriting practice worksheet. It consists of multiple rows of horizontal dashed lines spaced evenly down the page, providing a guide for letter height and placement. The background is plain white, and there are no margins or additional markings.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.