



Cambridge International AS & A Level

 CANDIDATE
NAME


 CENTRE
NUMBER

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MATHEMATICS

9709/23

Paper 2 Pure Mathematics 2

May/June 2026
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. Do **not** use correction fluid or tape.
- 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 **16** pages. Any blank pages are indicated.





- 1 Find $\int_a^{2a} (1 + e^{-x})^2 dx$. Give your answer in terms of the positive constant a . [4]

[illegible]



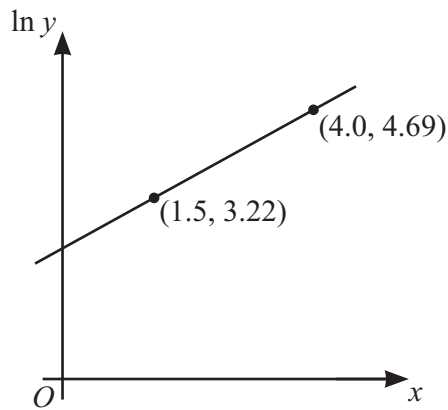
2 Solve the equation $3 \operatorname{cosec}^2 \theta = 7 + \cot^2 \theta$ for $-180^\circ < \theta < 180^\circ$.

[4]

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3



The variables x and y satisfy the equation $y = ka^{x+2}$, where k and a are positive constants. The graph of $\ln y$ against x is a straight line passing through the points $(1.5, 3.22)$ and $(4.0, 4.69)$, as shown in the diagram.

Find the values of k and a correct to 2 significant figures.

[5]

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- 4** A curve has equation $y = \frac{e^{2x}}{e^x + 2}$. The curve crosses the y -axis at the point P .

Find an equation of the normal to the curve at P . Give your answer in the form $ax + by + c = 0$, where a , b and c are integers. [6]

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5 (a) Solve the inequality $|4x - 7| \leq |2x + 3|$.

[4]

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(b) Hence, find the smallest and largest integers, N , that satisfy the inequality

$$\left| 4 \ln \left(\frac{1}{2} N \right) - 7 \right| \leq \left| 2 \ln \left(\frac{1}{2} N \right) + 3 \right|. \quad [3]$$

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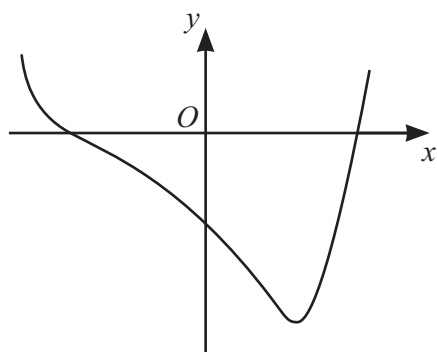
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The diagram shows the curve with equation $y = f(x)$, where

$$f(x) = ax^4 + 4x^3 - 3ax^2 - 21x - 18$$

and a is a constant. It is given that $(x + 2)$ is a factor of $f(x)$.

- (a) Find the value of a . [2]

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- (b) Show that the positive root of the equation $f(x) = 0$ satisfies the equation

$$x = \sqrt[3]{3x + 4.5}. \quad [3]$$

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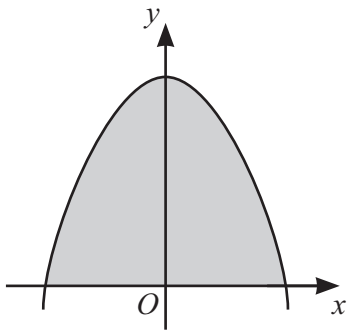
- (c) Use an iterative formula based on the equation $x = \sqrt[3]{3x+4.5}$ to find the positive root of the equation $f(x) = 0$ correct to 4 significant figures. Give the result of each iteration to 6 significant figures.

[3]





7



The diagram shows part of the curve with equation $y = 8 \cos 2x - \frac{1}{\cos^2 2x}$. The shaded region is bounded by the curve and the x -axis.

Find the exact area of the shaded region.

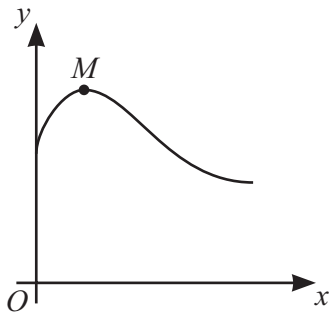
[7]

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[Turn over





The diagram shows the curve with parametric equations

$$x = 6t - \sin 2t, \quad y = 3 \cos 2t + 5 \sin t,$$

for $0 \leq t < \frac{1}{2}\pi$. The curve has a maximum point, M .

- (a)** Find the gradient of the curve at the point for which $t = 0$.

[4]

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(b) Find the exact y -coordinate of M .

[5]

This image shows a full page of primary-ruled paper. It features approximately 20 horizontal dotted lines spaced evenly down the page, providing a guide for handwriting practice. The background is white, and there are no margins or additional markings.



This image shows a single page 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.





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