



Cambridge International AS & A Level

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MATHEMATICS

9709/15

Paper 1 Pure Mathematics 1

May/June 2025

1 hour 50 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 75.
- The number of marks for each question or part question is shown in brackets [].

This document has **20** pages. Any blank pages are indicated.



- Find an equation of the curve.

[4]

[illegible]



- 2** In the expansion of $(3+ax)^5 + (6-x)^4$, the coefficient of x^2 is six times the coefficient of x .

Find the possible values of the constant a .

[5]

[illegible]



- 3 (a) Use completing the square to find the exact solutions of the equation $4x^2 - 4x - 1 = 0$. [2]

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- (b) Hence solve the equation $4 \tan \theta = 4 + \frac{1}{\tan \theta}$ for $0^\circ < \theta < 180^\circ$. [3]

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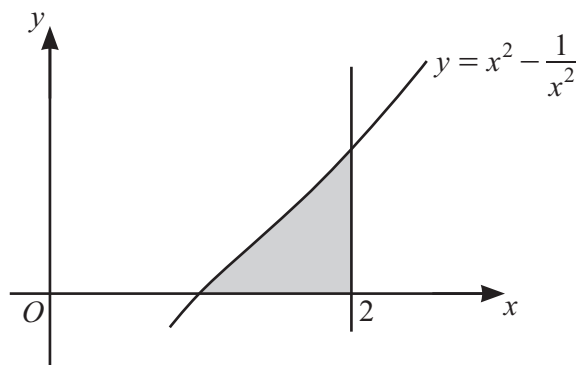
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The diagram shows part of the curve $y = x^2 - \frac{1}{x^2}$. The shaded region is bounded by the curve, the line $x = 2$ and the x -axis.

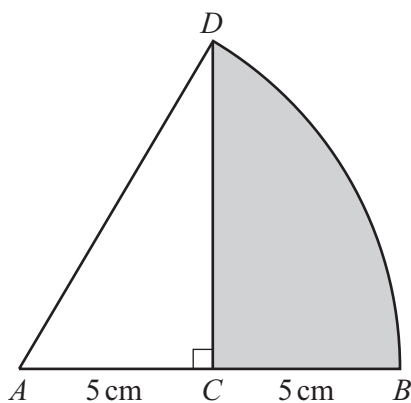
Find the volume formed when the shaded region is rotated through 360° about the x -axis, giving your answer correct to 2 decimal places. [5]

[illegible]



6

5



The diagram shows a sector ABD of a circle with centre A and radius 10 cm. The perpendicular bisector of AB passes through D .

- (a) Find the perimeter of the shaded region BCD , giving your answer correct to 1 decimal place. [4]

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.



(b) Find the area of the shaded region BCD , giving your answer correct to 1 decimal place.

[2]





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(b) Find the total amount of money Ananya receives up to and including her eighteenth birthday. [5]

[illegible]



- 7 In the parallelogram $ABCD$, the coordinates of A are $(3, 7)$, the coordinates of B are $(6, p)$ and the coordinates of D are $(1, p)$. It is given that the gradient of AB is $-\frac{2}{3}$.

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

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(b) Find the coordinates of C . [2]

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(c) Find the area of the triangle formed by the perpendicular bisector of AB and the x - and y -axes. [5]

[illegible]



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[5]

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(b) Find the coordinates of the other stationary point.

[3]

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(c) A point P is moving along part of the curve in such a way that the y -coordinate of P is increasing at a constant rate of 6 units per second.

Find the rate at which the x -coordinate of P is increasing when $x = 5$.

[3]

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9 Functions f and g are defined as follows.

$$f(x) = \cos x \text{ for } 0 \leq x \leq \pi$$

$$g(x) = 3 \cos(x - \pi) + 2 \text{ for } \pi \leq x \leq 2\pi$$

- (a) Describe fully the transformations that have been combined to transform the graph of $y = f(x)$ to the graph of $y = g(x)$. [4]

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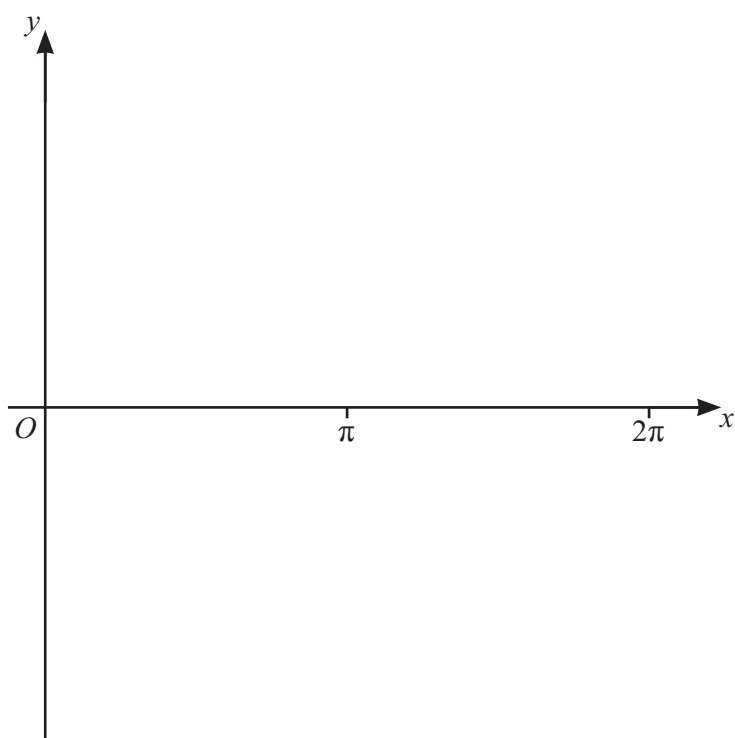
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- (b) On the given axes, sketch the graphs of $y = f(x)$ and $y = g(x)$. [4]





(c) Find $g^{-1}f\left(\frac{1}{3}\pi\right)$.

[4]

(d) Explain why the composite function fg cannot be formed.

[1]





(a) Find an equation of the tangent to the circle at the point $(2, 8)$, giving your answer in the form $ax + by + c = 0$. [4]

[illegible]



(b) Given that the line $x + 3y = k$ does **not** intersect the circle, show that $k^2 - 20k - 220 > 0$. [5]

This image shows a full page of white paper designed for handwriting practice. It features approximately 20 evenly spaced horizontal dotted lines running from left to right across the entire width of the page. There are no margins, text, or other markings present.



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

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