



Cambridge International AS & A Level

 CANDIDATE
NAME

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MATHEMATICS

9709/12

Paper 1 Pure Mathematics 1

May/June 2026
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. 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 75.
- The number of marks for each question or part question is shown in brackets [].

 This document has **20** pages.



- 1 The equation of a curve is such that $\frac{dy}{dx} = 2x - 6x^{\frac{1}{2}}$. The curve passes through the point $(4, -9)$.

[4]

Find the equation of the curve.

Handwriting practice lines consisting of multiple rows of dotted lines on a solid baseline, intended for the student to show their work.



(b) The curve with equation $y = x^3 - 3x - 4$ is stretched with scale factor $\frac{1}{2}$ in the x -direction and then translated by $\begin{pmatrix} 0 \\ -3 \end{pmatrix}$.

Find and simplify the equation of the transformed curve. [2]

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- 4]

Find the set of values of the constant k for which the line intersects the curve.

[illegible]

[5]

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.

5 (a) Prove the identity $\frac{1 - \sin \theta}{\cos \theta} + \frac{\cos \theta}{1 - \sin \theta} \equiv \frac{2}{\cos \theta}$.

[illegible]

[4]

This image shows a full page of a handwriting practice sheet. It consists of approximately 20 horizontal rows. Each row is defined by two parallel dotted lines, one above and one below the writing area, providing a guide for letter height and placement. The lines are evenly spaced and extend across the entire width of the page. There is no text or other markings on the sheet.

- [2]

[illegible]

It is further given that the length of PR is $\sqrt{85}$.

(b) Find the possible values of p and r .

[5]

[illegible]



7 A curve has equation

$$y = 3x^{-\frac{1}{2}} - 2x^{-\frac{3}{2}}.$$

The curve has a single stationary point when $x = k$, where $k > 0$.

(a) Find the value of k .

[4]

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(b) Find $\frac{d^2y}{dx^2}$, and hence determine whether the stationary point is a maximum or a minimum.

[2]

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- (c) Find the area enclosed by the curve, the x -axis and the lines $x = k$ and $x = 4$. Give your answer in the form $a + b\sqrt{c}$, where a , b and c are integers to be found. [4]

This image shows a full page of white paper with horizontal dotted lines, typical of primary school writing paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

- The third term of the geometric progression is 5 more than the third term of the arithmetic progression. The fifth term of the geometric progression is 30 more than the fifth term of the arithmetic progression.

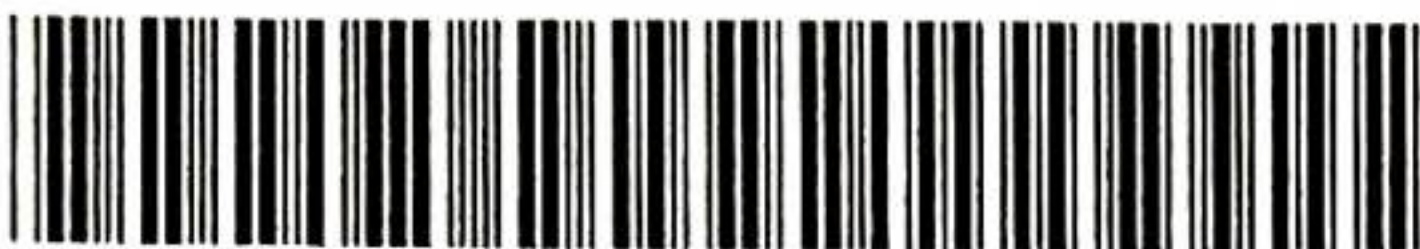
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This image shows a blank sheet of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting practice. There are no margins, text, or other markings on the paper.

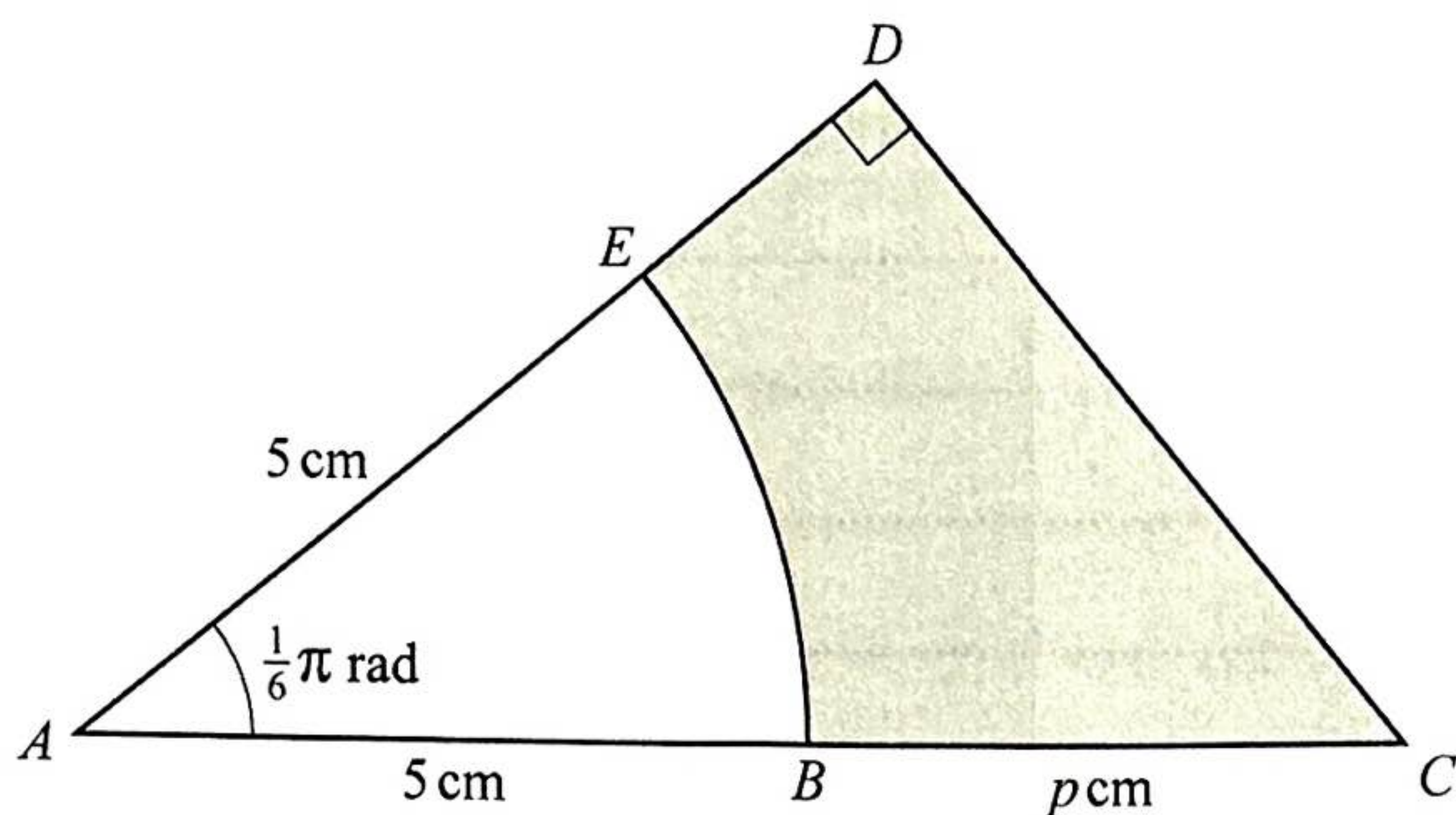


[2]

[illegible]



9



The diagram shows a triangle ACD in which AD is perpendicular to CD . The arc BE of a circle with centre A and radius 5 cm meets AC at B and AD at E . Angle BAE is $\frac{1}{6}\pi$ radians and the length $BC = p$ cm.

- (a) Given that the value of p is 4, find the exact perimeter of the shaded region. Give your answer in terms of π and $\sqrt{3}$. [4]

This image shows a full page of white paper with horizontal dotted lines, typical of primary school writing paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.



This image shows a full page of primary-ruled paper. It features multiple sets of horizontal lines designed to help young learners write neatly. Each set consists of three lines: two solid black dots forming the top and bottom boundaries, and a dashed black line in the middle representing the baseline for capital letters. The sets are evenly spaced vertically across the entire page.



10 Functions f and g are defined as follows:

$$f(x) = 3x - 6 \quad \text{for } x > 0,$$

$$g(x) = \frac{4}{(ax - 3)^2} \quad \text{for } x > \frac{3}{a},$$

where a is a positive constant.

(a) State the range of f .

[1]

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(b) Find $g^{-1}(x)$.

[2]

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(c) Given that $a = 2$, solve the equation $g^{-1}(x) = 4$.

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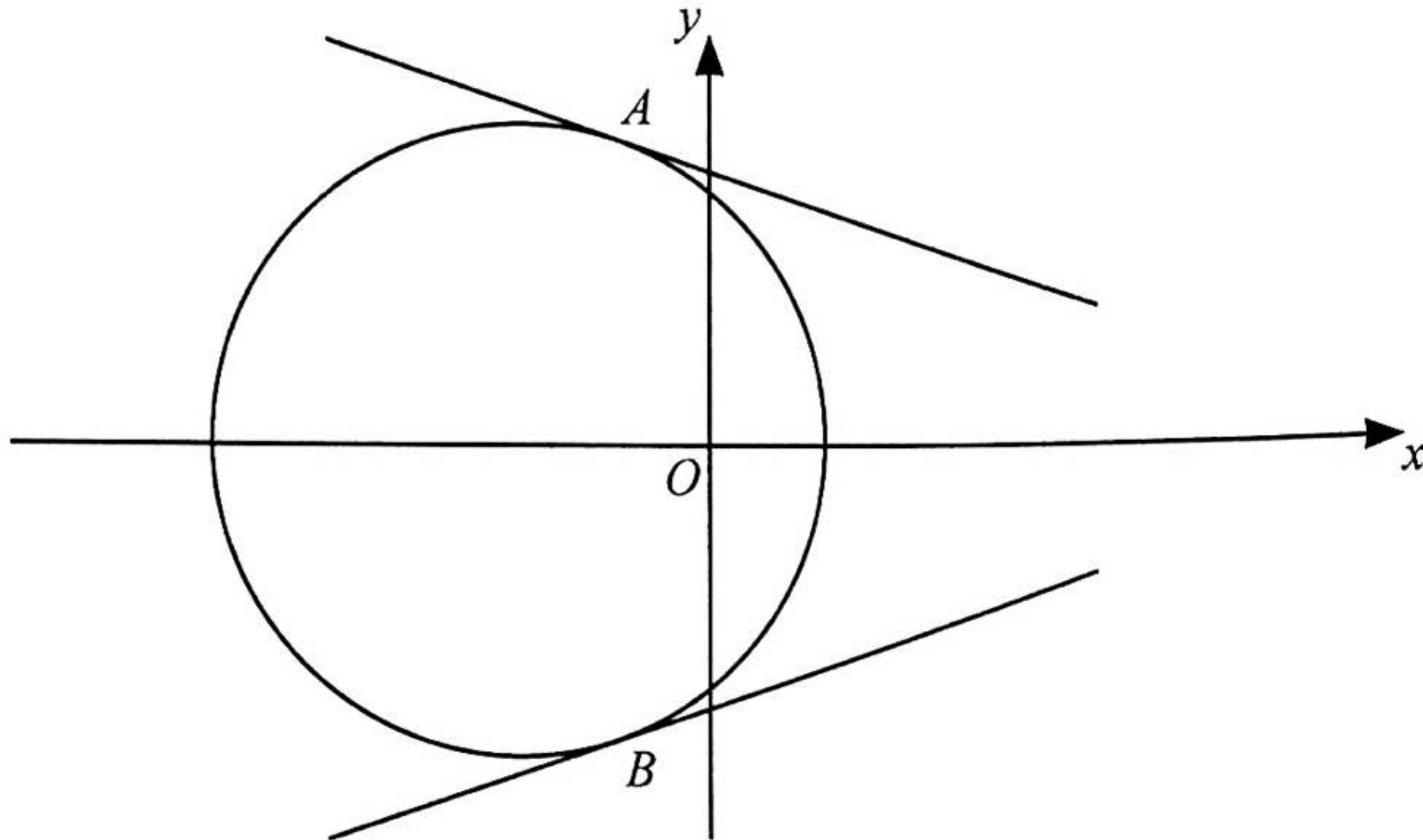
[4]

[illegible]

[Turn over



11



A tangent to a circle passes through the points $(1, 5)$ and $(4, 4)$ and meets the circle at the point A . Another tangent to the circle has equation $x - 3y = 16$ and meets the circle at the point B (see diagram).

- (a) Find the coordinates of the point of intersection of the two tangents. [4]

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(b) Find an equation of the normal to the circle which passes through A . Give your answer in terms of a . [2]

[illegible]

Find an equation of the circle. [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 is no handwriting or other markings on the paper.