



Cambridge International AS & A Level

CANDIDATE
NAME

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CENTRE
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MATHEMATICS

9709/01

Paper 1 Pure Mathematics 1

For examination from 2020

SPECIMEN PAPER

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 **22** pages. Blank pages are indicated.

- 5 (a) The curve $y = x^2 + 3x + 4$ is translated by $\begin{pmatrix} 2 \\ 0 \end{pmatrix}$.

Find and simplify the equation of the translated curve.

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- (b) The graph of $y = f(x)$ is transformed to the graph of $y = 3f(-x)$.

Describe fully the two single transformations which have been combined to give the resulting transformation.

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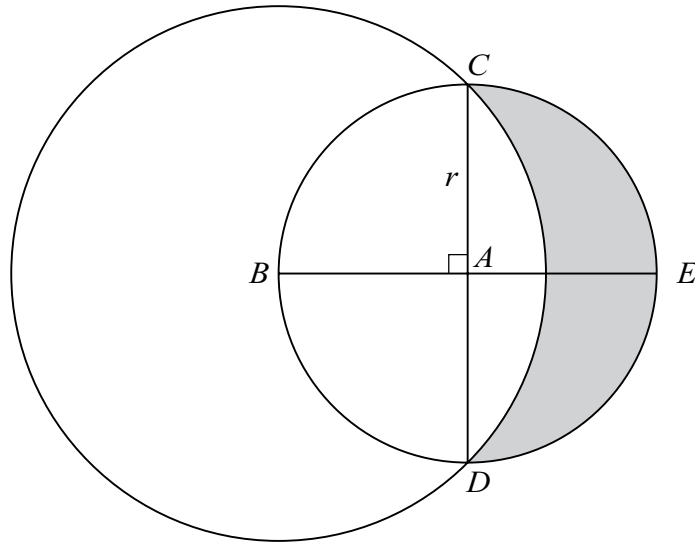
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The diagram shows a circle with centre A and radius r . Diameters CAD and BAE are perpendicular to each other. A larger circle has centre B and passes through C and D .

(a) Show that the radius of the larger circle is $r\sqrt{2}$. [1]

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(b) Find the area of the shaded region in terms of r . [6]

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11 The function f is defined, for $x \in \mathbb{R}$, by $f : x \mapsto x^2 + ax + b$, where a and b are constants.

(a) It is given that $a = 6$ and $b = -8$.

Find the range of f .

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(b) It is given instead that $a = 5$ and that the roots of the equation $f(x) = 0$ are k and $-2k$, where k is a constant.

Find the values of b and k .

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(c) Find the area of the shaded region. [4]

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(d) The gradient, $\frac{dy}{dx}$, of the curve has a minimum value m .
Calculate the value of m . [4]

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