



# Cambridge International AS & A Level

CANDIDATE  
NAME

--

CENTRE  
NUMBER

--	--	--	--	--

CANDIDATE  
NUMBER

--	--	--	--



**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.

[2]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

- (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.

[3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....





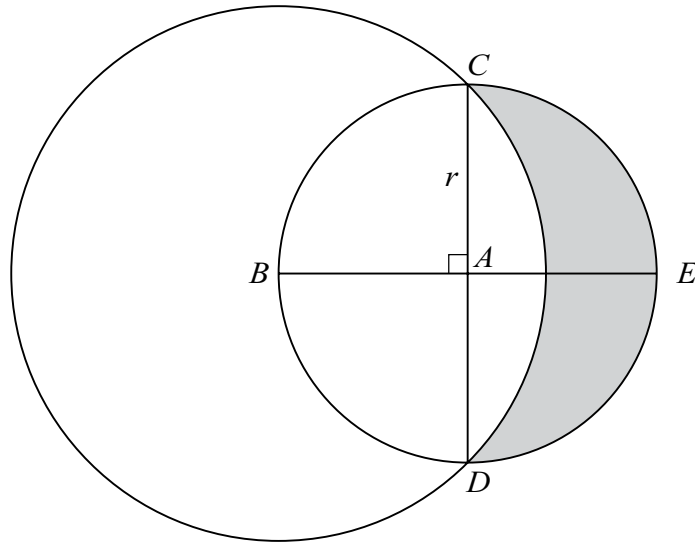








A series of horizontal dotted lines for writing.



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]

.....

.....

.....

.....

.....

.....

.....

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

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

A series of horizontal dotted lines for writing, spanning the width of the page.







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  $f$ .

[3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

(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  $k$ .

[3]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....







