



# Cambridge International AS & A Level

CANDIDATE  
NAME

--

CENTRE  
NUMBER

--	--	--	--	--

CANDIDATE  
NUMBER

--	--	--	--



**MATHEMATICS**

**9709/11**

Paper 1 Pure Mathematics 1

**May/June 2024**

**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.

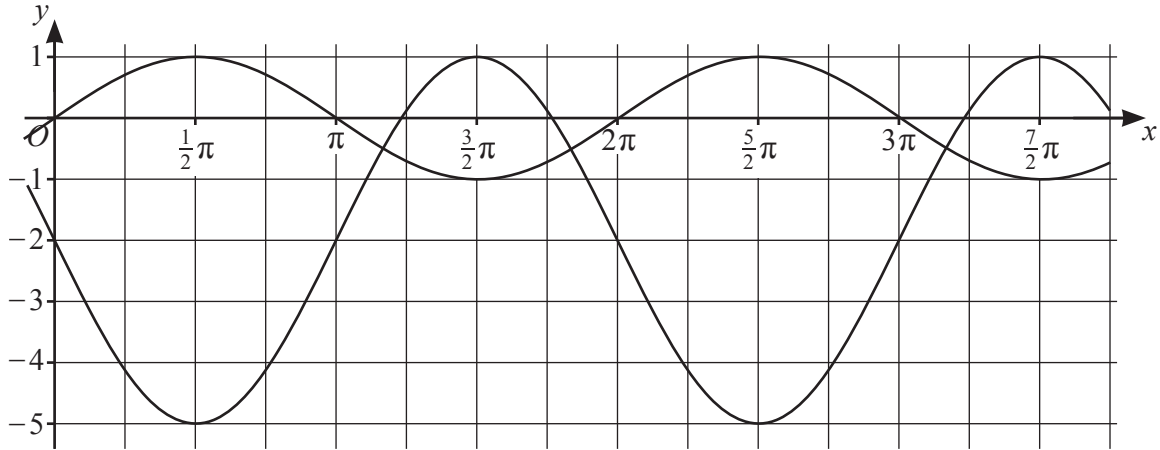
## INFORMATION

- 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.



2



The diagram shows two curves. One curve has equation  $y = \sin x$  and the other curve has equation  $y = f(x)$ .

- (a) In order to transform the curve  $y = \sin x$  to the curve  $y = f(x)$ , the curve  $y = \sin x$  is first reflected in the  $x$ -axis.

Describe fully a sequence of two further transformations which are required. [4]

.....

.....

.....

.....

.....

.....

.....

.....

- (b) Find  $f(x)$  in terms of  $\sin x$ . [2]

.....

.....

.....

.....

.....

.....

.....

.....



- 4 The equation of a curve is  $y = f(x)$ , where  $f(x) = (2x - 1)\sqrt{3x - 2} - 2$ . The following points lie on the curve. Non-exact values have been given correct to 5 decimal places.

$A(2, 4)$ ,  $B(2.0001, k)$ ,  $C(2.001, 4.00625)$ ,  $D(2.01, 4.06261)$ ,  $E(2.1, 4.63566)$ ,  $F(3, 11.22876)$

- (a) Find the value of  $k$ . Give your answer correct to 5 decimal places. [1]

.....

.....

.....

.....

The table shows the gradients of the chords  $AB$ ,  $AC$ ,  $AD$  and  $AF$ .

Chord	$AB$	$AC$	$AD$	$AE$	$AF$
Gradient of chord	6.2501	6.2511	6.2608		7.2288

- (b) Find the gradient of the chord  $AE$ . Give your answer correct to 4 decimal places. [1]

.....

.....

.....

.....

.....

.....

.....

.....

- (c) Deduce the value of  $f'(2)$  using the values in the table. [1]

.....

.....

.....

.....

.....

.....

.....

.....









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























**BLANK PAGE**

---

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at [www.cambridgeinternational.org](http://www.cambridgeinternational.org) after the live examination series.

Cambridge Assessment International Education is part of Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.