



Cambridge International AS & A Level

CANDIDATE NAME



CENTRE NUMBER

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CANDIDATE NUMBER

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MATHEMATICS

9709/22

Paper 2 Pure Mathematics 2

October/November 2024

1 hour 15 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 50.
- The number of marks for each question or part question is shown in brackets [].

This document has **16** pages. Any blank pages are indicated.







2 Let $f(x) = 4 \sin^2 3x$.

(a) Find the value of $f'(\frac{1}{4}\pi)$. [3]

Dotted lines for writing the answer to part (a).

(b) Find $\int f(x) dx$. [3]

Dotted lines for writing the answer to part (b).

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(b) Find the exact total area of regions A and B . Give your answer in the form $k \ln m$, where k and m are constants. [3]

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(c) Deduce an approximation to the area of region B . Give your answer correct to 3 significant figures. [1]

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(d) State, with a reason, whether your answer to part (c) is an over-estimate or an under-estimate of the area of region B . [2]

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