



## Cambridge International AS & A Level

CANDIDATE  
NAME

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**MATHEMATICS**

**9709/22**

Paper 2 Pure Mathematics 2

**October/November 2022**

**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 **12** pages.



2 The solutions of the equation  $|4x - 1| = |x + 3|$  are  $x = p$  and  $x = q$ , where  $p < q$ .

Find the exact values of  $p$  and  $q$ , and hence determine the exact value of  $|p - 2| - |q - 1|$ . [5]

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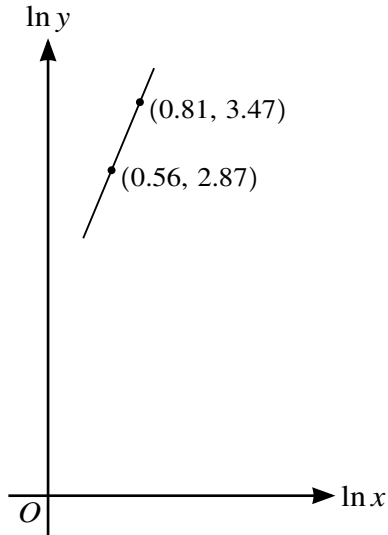
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3



The variables  $x$  and  $y$  satisfy the equation  $y = Ax^k$ , where  $A$  and  $k$  are constants. The graph of  $\ln y$  against  $\ln x$  is a straight line passing through the points  $(0.56, 2.87)$  and  $(0.81, 3.47)$ , as shown in the diagram.

Find the value of  $k$ , and the value of  $A$  correct to 2 significant figures. [5]

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4 The polynomial  $p(x)$  is defined by

$$p(x) = ax^3 + 23x^2 - ax - 8,$$

where  $a$  is a constant. It is given that  $(2x + 1)$  is a factor of  $p(x)$ .

(a) Find the value of  $a$  and hence factorise  $p(x)$  completely. [5]

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(b) Hence solve the equation  $p(e^{4y}) = 0$ , giving your answer correct to 3 significant figures. [2]

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(b) Show by calculation that the  $x$ -coordinate of  $P$  lies between 1.8 and 1.9. [2]

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(c) Use an iterative formula, based on the equation in part (a), to find the  $x$ -coordinate of  $P$  correct to 3 significant figures. Give the result of each iteration to 5 significant figures. [3]

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**Additional Page**

If you use the following lined page to complete the answer(s) to any question(s), the question number(s) must be clearly shown.

Lined area for writing answers, consisting of 25 horizontal dotted lines.

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