



## Cambridge International AS & A Level

CANDIDATE  
NAME

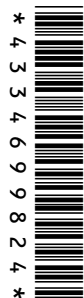
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CENTRE  
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**MATHEMATICS**

**9709/22**

Paper 2 Pure Mathematics 2

**May/June 2020**

**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. Blank pages are indicated.

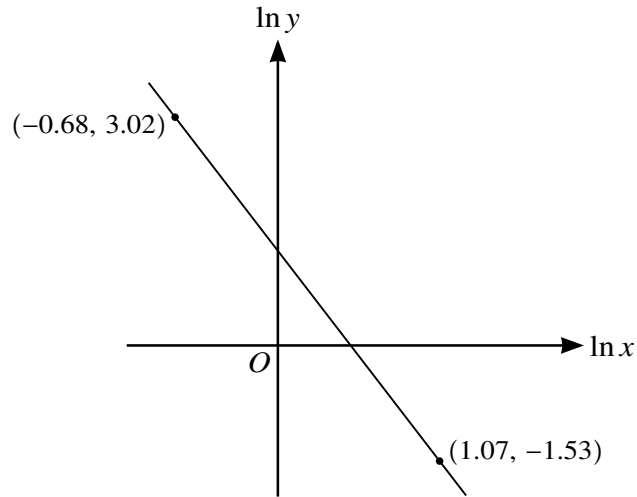
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The variables  $x$  and  $y$  satisfy the equation  $y = Ax^{-2p}$ , where  $A$  and  $p$  are constants. The graph of  $\ln y$  against  $\ln x$  is a straight line passing through the points  $(-0.68, 3.02)$  and  $(1.07, -1.53)$ , as shown in the diagram.

Find the values of  $A$  and  $p$ . [5]

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- 5 (a) Sketch, on the same diagram, the graphs of  $y = |2x - 3|$  and  $y = 3x + 5$ . [2]

- (b) Solve the inequality  $3x + 5 < |2x - 3|$ . [3]

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

$$p(x) = 6x^3 + ax^2 - 4x - 3,$$

where  $a$  is a constant. It is given that  $(x + 3)$  is a factor of  $p(x)$ .

(a) Find the value of  $a$ . [2]

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(b) Using this value of  $a$ , factorise  $p(x)$  completely. [3]

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(b) Using the equation in part (a), show by calculation that  $1 < a < 2$ . [2]

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(c) Use an iterative formula, based on the equation in part (a), to find the value of  $a$  correct to 4 significant figures. Give the result of each iteration to 6 significant figures. [3]

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8 (a) Show that  $3 \sin 2\theta \cot \theta \equiv 6 \cos^2 \theta$ . [2]

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(b) Solve the equation  $3 \sin 2\theta \cot \theta = 5$  for  $0 < \theta < \pi$ . [3]

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