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CAMBRIDGE
International Education

Cambridge International AS & A Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

8177640083

MATHEMATICS **9709/22**

Paper 2 Pure Mathematics 2 **February/March 2026**

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. Do **not** use correction fluid or tape.
- 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.

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1 It is given that $\tan(\theta + 135°) = k$.

Find the value of $\tan\theta$ in terms of the constant k. [3]

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2 **(a)** Sketch, on the same diagram, the graphs of $y = |3x - 4|$ and $y = 7 - 10x$. [2]

(b) Solve the equation $|3x - 4| = 7 - 10x$. [2]

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(c) Hence, solve the equation $|3^{2t+1} - 4| = 7 - 10 \times 3^{2t}$. Give your answer correct to 3 significant figures. [2]

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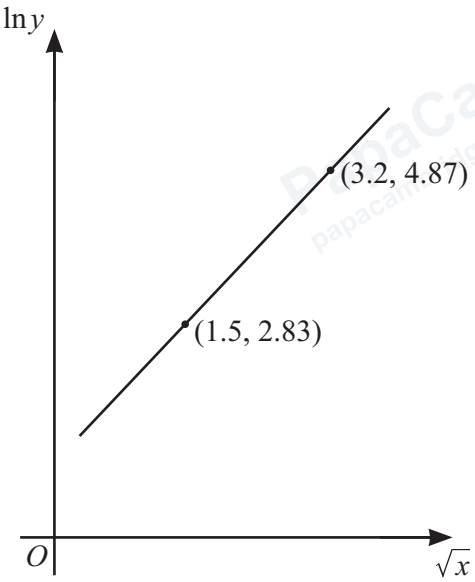

The variables x and y satisfy the equation $y = ke^{a\sqrt{x}}$, where k and a are positive constants.

The graph of $\ln y$ against $\sqrt{x}$ is a straight line passing through the points (1.5, 2.83) and (3.2, 4.87), as shown in the diagram.

Find the values of k and a correct to 1 decimal place. [5]

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4 A curve has equation

$$(x^2 - 3)\cos y + 4\cos^3 y = 1.$$

Find the exact gradient of the curve at the point $\left(2, \frac{1}{3}\pi\right)$. [6]

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5 The polynomial $\mathrm{p}(x)$ is defined by

$$\mathrm{p}(x) = ax^3 + x^2 + (a+1)x + 1,$$

where a is a constant. It is given that the remainder is -3 when $\mathrm{p}(x)$ is divided by $(2x+1)$.

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

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(b) Hence, factorise the expression $\mathrm{p}(x) + 3$. [2]

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(c) Solve the equation $p\left(\frac{1}{2+\operatorname{cosec}\theta}\right)+3=0$ to find the least positive value of θ in degrees. [2]

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6 Find the exact value of $\int_{\frac{1}{6}\pi}^{\frac{1}{3}\pi} (4\cos^2 2x + 3\tan^2 x)\,\mathrm{d}x$. [6]

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7 It is given that $\int_a^{2a} \frac{1}{4}e^{2x}(2+e^{-x})\,dx = 50$, where a is a positive constant.

(a) Show that $a = \frac{1}{4}\ln(200+e^a)$. [5]

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(b) Show by calculation that the value of a lies between 1.0 and 1.5. [2]

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(c) Use an iterative formula, based on the equation in **7(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 curve has equation

$$y = \frac{10 + 2\ln x}{1 + \ln x}.$$

The point on the curve for which $y = 4$ is denoted by P. The tangent to the curve at P meets the x-axis at the point Q.

Find the exact x-coordinate of Q. [8]

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