GradeMax

Cambridge International AS Level

Cambridge International Examinations
Cambridge International Advanced Subsidiary Level

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

3909671742

MATHEMATICS **9709/22**

Paper 2 Pure Mathematics 2 **(P2)** **October/November 2018**

1 hour 15 minutes

Candidates answer on the Question Paper.

Additional Materials: List of Formulae (MF9)

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name in the spaces at the top of this page.
Write in dark blue or black pen.
You may use an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** the questions in the space provided. If additional space is required, you should use the lined page at the end of this booklet. The question number(s) must be clearly shown.
Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place in the case of angles in degrees, unless a different level of accuracy is specified in the question.
The use of an electronic calculator is expected, where appropriate.
You are reminded of the need for clear presentation in your answers.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total number of marks for this paper is 50.

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1 Solve the inequality $|3x - 5| < 2|x|$. [4]

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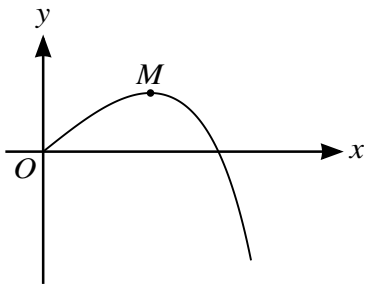
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2 Given that $9^x + 3^x = 240$, find the value of 3^x and hence, using logarithms, find the value of x correct to 4 significant figures. [5]

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[Turn over

3



The diagram shows the curve with equation

$$y = 5\sin 2x - 3\tan 2x$$

for values of x such that $0 \leqslant x < \frac{1}{4}\pi$. Find the x-coordinate of the stationary point M, giving your answer correct to 3 significant figures. [5]

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4 Find the gradient of the curve

$$4x + 3ye^{2x} + y^2 = 10$$

at the point (0, 2). [5]

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5 The curve with equation

$$y = 5e^{2x} - 8x^2 - 20$$

crosses the x-axis at only one point. This point has coordinates $(p, 0)$.

(i) Show that p satisfies the equation $x = \frac{1}{2}\ln(1.6x^2 + 4)$. [2]

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(ii) Show by calculation that $0.75 < p < 0.85$. [2]

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(iii) Use an iterative formula based on the equation in part **(i)** to find the value of p correct to 5 significant figures. Give the result of each iteration to 7 significant figures. [3]

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(iv) Find the gradient of the curve at the point $(p, 0)$. [3]

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[Turn over

6 **(a)** Show that $\int_1^6 \frac{12}{3x+2}\,\mathrm{d}x = \ln 256$. [5]

(b) Find the exact value of $\int_0^{\frac{1}{6}\pi} (8\sin^2 x + \tan^2 2x)\,\mathrm{d}x$, showing all necessary working. [6]

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7 **(i)** Use the factor theorem to show that $(2x + 3)$ is a factor of

$$8x^3 + 4x^2 - 10x + 3.$$ [2]

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(ii) Show that the equation $2\cos 2\theta = \dfrac{6\cos\theta - 5}{2\cos\theta + 1}$ can be expressed as

$$8\cos^3\theta + 4\cos^2\theta - 10\cos\theta + 3 = 0.$$ [3]

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(iii) Solve the equation $2\cos 2\theta = \dfrac{6\cos\theta - 5}{2\cos\theta + 1}$ for $0° < \theta < 360°$. [5]

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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.

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