

CANDIDATE
NAME

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CENTRE
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CANDIDATE
NUMBER

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Secondary 6

07/08/24

MATHEMATICS (9709)

August 2024

Paper 3 Pure Mathematics

1 hour 15 minutes

Candidate answers on the Question Paper
Additional Materials: List of formulae (MF 19)

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 [].

For Teacher's Use Only

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This document consists of **10** printed pages.

[DON'T WRITE HERE]

1. (a) Sketch, on the same diagram, the graphs of $y = |3x - 5|$ and $y = 2x + 7$. [2]

- (b) Solve the equation $|3x - 5| = 2x + 7$. [3]

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- (c) Hence solve the equation $|3^{y+1} - 5| = 2 \times 3^y + 7$, giving your answer correct to 3 significant figures. [2]

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2. The polynomial $p(x)$ is defined by

$$p(x) = 6x^3 + ax^2 + bx - 20,$$

where a and b are constants. It is given that $(x + 2)$ is a factor of $p(x)$ and that the remainder is -11 when $p(x)$ is divided by $(x + 1)$.

- (a) Find the values of a and b .

[5]

[illegible]

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3. It is given that θ is an acute angle in degrees such that $\sin \theta = \frac{2}{3}$.

Find the exact value of $\sin(\theta + 60^\circ)$.

[3]

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4. (a) Express $7 \cos \theta + 24 \sin \theta$ in the form $R \cos(\theta - \alpha)$, where $R > 0$ and $0^\circ < \alpha < 90^\circ$. Give the value of α correct to 2 decimal places. [3]

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- (b) Solve the equation $7 \cos \theta + 24 \sin \theta = 18$ for $0^\circ < \theta < 360^\circ$. [4]

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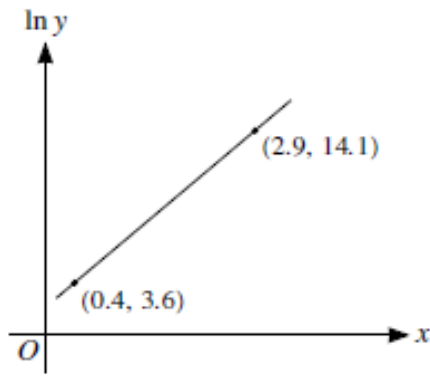
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7.



The variables x and y satisfy the equation $y = Ae^{(A-B)x}$, where A and B are constants. The graph of $\ln y$ against x is a straight line passing through the points $(0.4, 3.6)$ and $(2.9, 14.1)$, as shown in the diagram.

Find the values of A and B correct to 3 significant figures.

[5]

[illegible]

8.

- a) Solve the inequality $|3 - x| > 9 - 2x$. [3]

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- b) Use logarithms to solve the inequality $2^{3x-10} < 500$. Give your answer in the form $x < a$, where the value of a is given correct to 3 significant figures. [3]

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- c) List the integers that satisfy both of the inequalities $|3 - x| > 9 - 2x$ and $2^{3x-10} < 500$. [2]

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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.

[illegible]