

Practice paper 1

Time allowed: 1 hour 30 minutes

- Answer all the questions
- Unless otherwise stated in the question, all numerical answers must be given exactly or correct to three significant figures.

Full marks are not necessarily awarded for a correct answer with no working. Answers must be supported by working and/or explanations. Where an answer is incorrect, some marks may be given for a correct method, provided this is shown by written working. You are therefore advised to show all working.

- [3 marks]

This image shows a full page of white paper with horizontal dotted lines. The lines are evenly spaced and run across the width of the page, providing a guide for handwriting or typing. There are no margins, text, or other markings on the page.

[illegible]

- 2** Given that $f(x) = e^{-2x}$, answer the following.

a Find the first four derivatives of $f(x)$.

b Write an expression for $f^{(n)}(x)$ in terms of x and n .

[illegible]

Handwriting practice lines consisting of 40 horizontal dotted lines.

- [1 mark]
[5 marks]

[illegible]

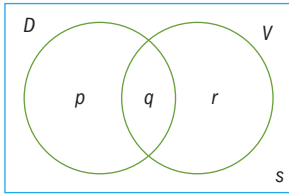
[illegible]

- [3 marks]
[4 marks]

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This image shows a single page of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

- 5** The Venn diagram below shows information about 40 students in a theater class. Of these, 11 take a dance class (D), 14 take a voice class (V) and 5 take both a dance and a voice class.



- a** Write down the value of

i p ;

ii q ;

iii r ,

iv *S.*

- b** Find the value of $P(V | D')$.

- c** Show that the V and D are **not** mutually exclusive.

[4 marks]

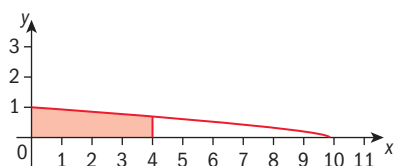
[2 marks]

[1 mark]

This image shows a full page of a document template designed for handwritten notes or essays. It features approximately 30 evenly spaced, thin horizontal grey lines across the entire width of the page. The margins are consistent on all sides, providing ample space for writing. There are no titles, headers, or other markings present on the page.

[illegible]

by $f(x) = \sqrt{\sin\left(x^{\frac{1}{2}}\right)}$, $x = 4$, the x -axis and the y -axis.



The shaded region is rotated 360° about the x -axis to form a solid.

- a** Write down a definite integral that gives the volume of the solid. [1 mark]
b Given that the volume of the solid is $p\pi(\cos(q) - 1)$, find the values of p and q . [5 mark]

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[illegible]

7 Let $f(x) = 4^{-x}$.

a Write down $\lim_{x \rightarrow \infty} f(x)$.

[1 mark]

b Show that $f^{-1}(x) = \log_4 \frac{1}{x}$.

[2 marks]

Let $g(x) = 2^x$.

c Find the value of $(f^{-1} \circ g)(4)$, giving your answer as an integer.

[4 marks]

This image shows a single page of white paper with horizontal blue or grey ruling lines. The lines are evenly spaced and run across the width of the page, leaving small margins at the top and bottom. There is no handwriting or other markings on the paper.

Handwriting practice lines consisting of 40 horizontal dotted lines.

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[4 marks]

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[illegible]

- [5 marks]*

[illegible]

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- 10** The line L_1 is represented by the vector equation $r = \begin{pmatrix} 0 \\ 4 \\ 1 \end{pmatrix} + p \begin{pmatrix} 8 \\ -2 \\ 12 \end{pmatrix}$.

A second line L_2 is perpendicular to L_1 and represented by the

vector equation $r = \begin{pmatrix} 4 \\ -2 \\ 15 \end{pmatrix} + s \begin{pmatrix} 2 \\ 2 \\ l \end{pmatrix}$.

- [5 marks]

The lines L_1 and L_2 intersect at the point A.

- [6 marks]

$$\text{Let } \overrightarrow{\text{OB}} = \begin{pmatrix} 9 \\ 6 \\ 10 \end{pmatrix} \text{ and } \overrightarrow{\text{BC}} = \begin{pmatrix} 1 \\ -5 \\ 2 \end{pmatrix}.$$

- c i** Find \vec{BA} .

- [7 marks]

This image shows a single sheet of white paper with horizontal ruling lines. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

Handwriting practice lines consisting of 40 sets of three horizontal dotted lines.