

1 Find the exact value of $\int_1^2 \ln 3x \, dx$. Give your answer in the form $a + \ln b$, where a and b are integers. [4]

[4]

This image shows a full page of white paper with horizontal dotted lines, typical of primary school writing paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

9 The constant a is such that $\int_1^a 6x \ln x \, dx = 4$.

(a) Show that $a = \exp\left(\frac{1}{6}\left(\frac{5}{a^2} + 3\right)\right)$, where $\exp(x)$ denotes e^x . [5]

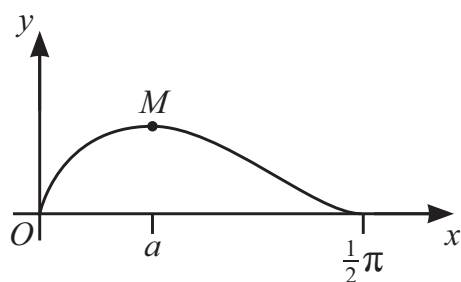
[illegible]

- [2]

[illegible]

- [3]

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



The diagram shows the curve $y = \cos x \sqrt{\sin 2x}$ for $0 \leq x \leq \frac{1}{2}\pi$. The curve has a maximum point at M , where $x = a$.

- (a)** Find the exact value of a .

[6]

Handwriting practice lines (dotted lines on a solid background) for the letter 'd'.

- (b)**

Find the exact volume of the solid generated.

[5]

[illegible]

Additional page

If you use the following page to complete the answer to any question, the question number must be clearly shown.

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 practice. There are no margins, text, or other markings on the page.

10 (a)

[2]

This image shows a full page of white paper with horizontal dotted lines, typical of primary school writing paper. The lines are evenly spaced and run across the width of the page. There are no margins, text, or other markings on the paper.

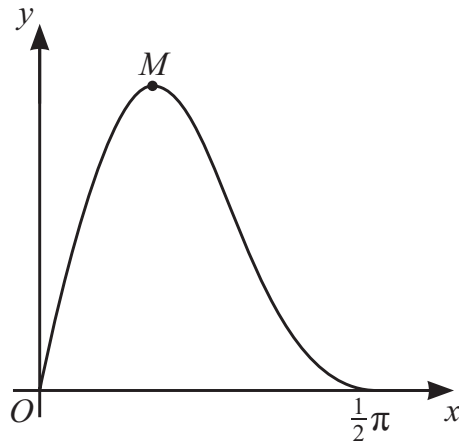
(b) Find the exact value of $\int_0^{0.5} x \tan^{-1}(2x) \, dx$.

[6]

[illegible]

[illegible]

11



The diagram shows the graph of $y = 5 \sin 2x \cos^2 x$ for $0 \leq x \leq \frac{1}{2}\pi$ and its maximum point M .

- (a) Find the exact x -coordinate of M .

[6]

Handwriting practice sheet with 15 rows of dotted lines for tracing and writing.

- [5]

[illegible]

Additional page

If you use the following page to complete the answer to any question, the question number must be clearly shown.

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