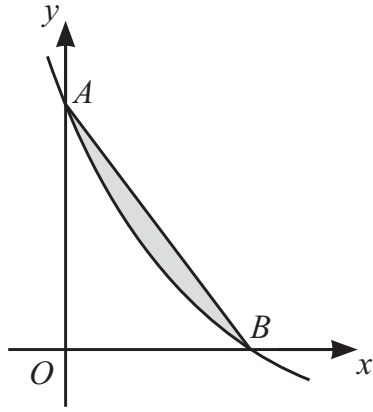


[3]

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.

5



The diagram shows the curve with equation $y = 8e^{-\frac{1}{2}x} - 1$. The curve meets the axes at the points A and B . The shaded region is bounded by the curve and the line segment AB .

- (a)** Show that the x -coordinate of B is $6 \ln 2$. [2]

.....

.....

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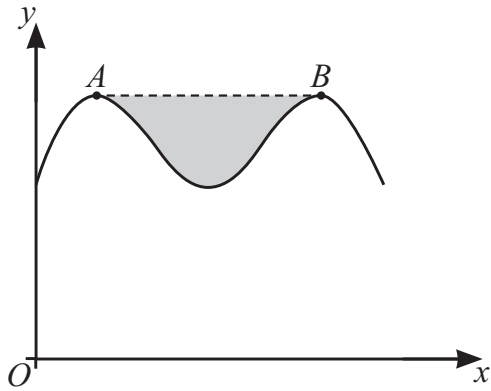
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- (b)** Find the area of the shaded region. Give your answer in the form $p \ln 2 - q$, where p and q are positive integers. [5]

[illegible]

5



The diagram shows the curve with equation $y = 4 \cos 2x + 8 \sin x$ for $0 \leq x \leq \pi$. The maximum points on the curve are denoted by A and B , and the shaded region is bounded by the line segment AB and the curve.

- (a)** Find the coordinates of A and B .

[5]

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

(b)

[6]

④

6

(a)

Given that $\int_{-2a}^a \left(\frac{1}{2}e^{2x} + \frac{1}{4}e^{-x} \right) dx = 5$, where a is a positive constant, show that

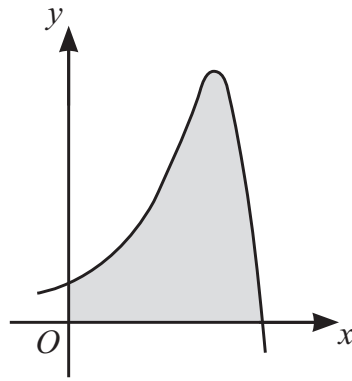
[4]

(b) Hence show by calculation that the value of a lies between 1.0 and 1.2. [2]

(c) Use the iterative formula

$$a_{n+1} = \frac{1}{2} \ln \left(10 + \frac{1}{2} e^{-a_n} + \frac{1}{2} e^{-4a_n} \right)$$

to find the value of a correct to 4 significant figures. Give the result of each iteration to 6 significant figures. [3]



The diagram shows the curve with equation $y = 6e^{2x} - e^{3x}$. The shaded region is bounded by the axes and the curve.

- (a) Find the exact x -coordinate of the maximum point. [3]

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.

(b) Find the area of the shaded region. Give your answer in the form $\frac{p}{q}$, where p and q are integers. [4]

[illegible]

7

(a)

Prove that $\sin^2 2x + 4 \cos^2 x \cos 2x \equiv 4 \cos^4 x$.

[3]

This image shows a full page of white paper with horizontal dashed 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)

$$\sin^2 2x + 4 \cos^2 x \cos 2x + 5 = k$$

has no real solutions.

[2]

[illegible]

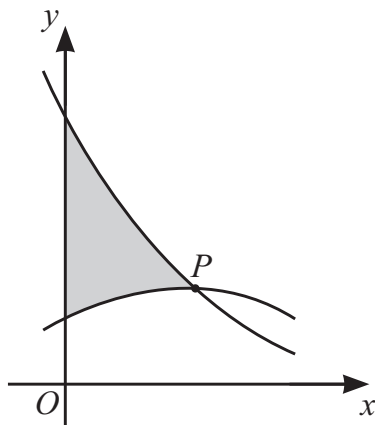
Additional page

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

[illegible]

[3]

This image shows a full page of white paper with horizontal dashed lines, typical of primary-ruled notebook 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.



The diagram shows parts of the curves with equations $y = 4e^{-2x}$ and $y = 1 + 0.5 \sin 3x$. Point P is a point of intersection of the curves, and the shaded region is bounded by the two curves and the y -axis.

- (a)** Show that the x -coordinate of P satisfies the equation $x = -0.5 \ln(0.25 + 0.125 \sin 3x)$. [1]

- (b)** Use an iterative formula, based on the equation in part **(a)**, to find the x -coordinate of P correct to 4 significant figures. Use an initial value of 0.5 and give the result of each iteration to 6 significant figures. [3]

13

(c) Hence find the area of the shaded region. Give your answer correct to 2 significant figures. [4]

Handwriting practice lines (dotted lines) for the letter 'a'.