

7

(b)

[4

This image shows a blank sheet of white paper designed for handwriting practice. It features approximately 20 horizontal dotted lines spaced evenly down the page. A large, light gray watermark with the text "pastpaperpenguin.com" is oriented diagonally from the bottom-left towards the top-right, spanning across the entire page. The watermark is semi-transparent, allowing the ruled lines to remain visible beneath it. There are no margins, text, or other markings on the paper.

- 4 (a) Prove that $\frac{1 - \cos 2\theta}{1 + \cos 2\theta} \equiv \tan^2 \theta$. [2]

.....

.....

.....

.....

.....

.....

.....

.....

- (b) Hence find the exact value of $\int_{\frac{1}{6}\pi}^{\frac{1}{3}\pi} \frac{1 - \cos 2\theta}{1 + \cos 2\theta} d\theta$. [4]

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

.....

- 6 (a)** Using the expansions of $\sin(3x + 2x)$ and $\sin(3x - 2x)$, show that

$$\frac{1}{2}(\sin 5x + \sin x) \equiv \sin 3x \cos 2x. \quad [3]$$

This image shows a blank sheet of white paper designed for handwriting practice. It features approximately 20 horizontal dotted lines spaced evenly down the page. A large, light gray watermark with the text "pastpaperpenguin.com" is oriented diagonally from the bottom-left towards the top-right, spanning across the entire page. The watermark is semi-transparent, allowing the ruled lines to remain visible beneath it. There are no other markings, text, or illustrations on the page.

(b) Hence show that $\int_0^{\frac{1}{4}\pi} \sin 3x \cos 2x \, dx = \frac{1}{5}(3 - \sqrt{2})$. [3]

This image shows a full page of primary-ruled paper. It features multiple sets of horizontal dotted lines spaced evenly down the page, providing a guide for handwriting practice. A large, light gray watermark with the text "pastpaperpenquin.com" is oriented diagonally from the bottom left towards the top right, spanning across the entire page. The background is white, and there are no other markings or text present.

- [3]

[illegible]

- [4]

This image shows a blank sheet of white paper with horizontal ruling lines. The lines are evenly spaced and extend across the width of the page. A faint, diagonal watermark reading "Pastpaper" is visible across the center.

7 (a) Show that $\cos^4 \theta - \sin^4 \theta \equiv \cos 2\theta$.

[3]

pastpaperpenguin.com

(b) Hence find the exact value of $\int_{-\frac{1}{8}\pi}^{\frac{1}{8}\pi} (\cos^4 \theta - \sin^4 \theta + 4 \sin^2 \theta \cos^2 \theta) d\theta$. [6]

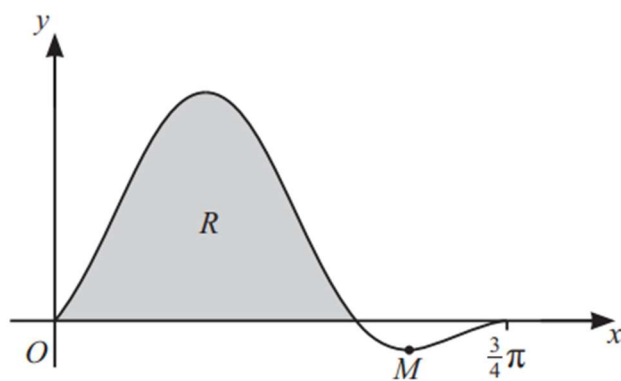
[illegible]

- 8 (a)** Express $3 \cos 2x - \sqrt{3} \sin 2x$ in the form $R \cos(2x + \alpha)$, where $R > 0$ and $0 < \alpha < \frac{1}{2}\pi$. Give the exact values of R and α . [3]

Pastpaperpenguin.com

(b) Hence find the exact value of $\int_0^{\frac{1}{12}\pi} \frac{3}{(3 \cos 2x - \sqrt{3} \sin 2x)^2} dx$, simplifying your answer. [5]

[illegible]



The diagram shows the curve $y = \sin 2x(1 + \sin 2x)$, for $0 \leq x \leq \frac{3}{4}\pi$, and its minimum point M . The shaded region bounded by the curve that lies above the x -axis and the x -axis itself is denoted by R .

- (b) Find the exact area of the region R .

[4]

Handwriting practice lines (dotted lines on a solid background).