

1

[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.

2

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

3

(a)

$$|2x - 3| = |5x + 2|.$$

[3]

[illegible]

(b)

$|2 \sec \theta - 3| = |5 \sec \theta + 2|$ for $\pi < \theta < 2\pi$. Give your answer correct to

[3]

[illegible]

4

[5]

6 A curve has parametric equations

$$x = \tan \theta, \quad y = \sin \theta - 2 \sin^3 \theta,$$

for $0 < \theta < \frac{1}{2}\pi$.

(a) Show that $\frac{dy}{dx} = 6 \cos^5 \theta - 5 \cos^3 \theta$.

[4]

[illegible]

- (b)** Find the equation of the normal to the curve at the point where it crosses the x -axis. Give your answer in the form $y = mx + c$, where m and c are exact constants. [5]

[illegible]

3 (a) Sketch, on a single diagram, the graphs of $y = 3e^{-2x}$ and $y = \sec x$ for values of x such that $0 \leq x < \frac{1}{2}\pi$. [2]

(b) Show that the x -coordinate of the point of intersection of the two graphs satisfies the equation $x = \frac{1}{2}\ln(3\cos x)$. [2]

(c) Use an iterative formula, based on the equation in part (b), to find the x -coordinate of the point of intersection correct to 3 decimal places. Give the result of each iteration to 5 decimal places. [3]