

GCE Examinations  
Advanced Subsidiary

## Core Mathematics C4

Paper 1

Time: 1 hour 30 minutes

### *Instructions and Information*

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Candidates may use any calculator EXCEPT those with the facility for symbolic algebra, differentiation and/or integration.

Full marks may be obtained for answers to ALL questions.

Mathematical formulae and statistical tables are available.

This paper has seven questions.

### *Advice to Candidates*

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You must show sufficient working to make your methods clear to an examiner.  
Answers without working may gain no credit.



*Written by Shaun Armstrong*

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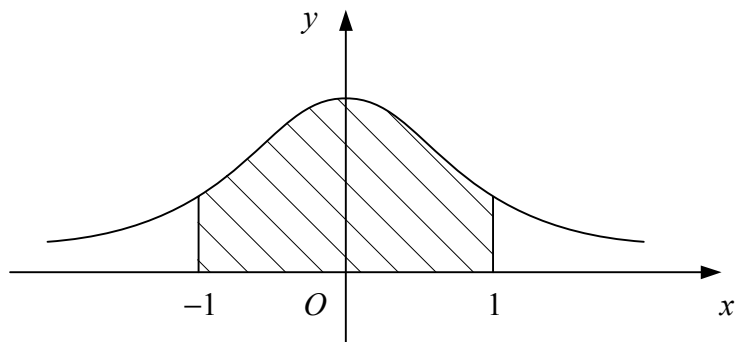








4.



**Figure 2**

Figure 2 shows the curve with parametric equations

$$x = \tan \theta, \quad y = \cos^2 \theta, \quad -\frac{\pi}{2} < \theta < \frac{\pi}{2}.$$

The shaded region bounded by the curve, the  $x$ -axis and the lines  $x = -1$  and  $x = 1$  is rotated through  $2\pi$  radians about the  $x$ -axis.

(a) Show that the volume of the solid formed is  $\frac{1}{4} \pi(\pi + 2)$ . **(8)**

(b) Find a cartesian equation for the curve. **(3)**

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