

Please check the examination details below before entering your candidate information

Candidate surname

Other names

Pearson Edexcel
International
Advanced Level

Centre Number

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Candidate Number

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Sample Assessment Materials for first teaching September 2018

(Time: 1 hour 30 minutes)

Paper Reference **WME03/01**

Mathematics

International Advanced Subsidiary/Advanced Level
Mechanics M3

You must have:

Mathematical Formulae and Statistical Tables, calculator

Total Marks

Candidates may use any calculator permitted by Pearson regulations. Calculators must not have the facility for symbolic algebra manipulation, differentiation and integration, or have retrievable mathematical formulae stored in them.

Instructions

- Use **black** ink or ball-point pen.
- If pencil is used for diagrams/sketches/graphs it must be dark (HB or B).
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions and ensure that your answers to parts of questions are clearly labelled.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- You should show sufficient working to make your methods clear. Answers without working may not gain full credit.
- Inexact answers should be given to three significant figures unless otherwise stated.

Information

- A booklet 'Mathematical Formulae and Statistical Tables' is provided.
- There are 6 questions in this question paper. The total mark for this paper is 75.
- The marks for each question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.
- If you change your mind about an answer, cross it out and put your new answer and any working underneath.

Turn over

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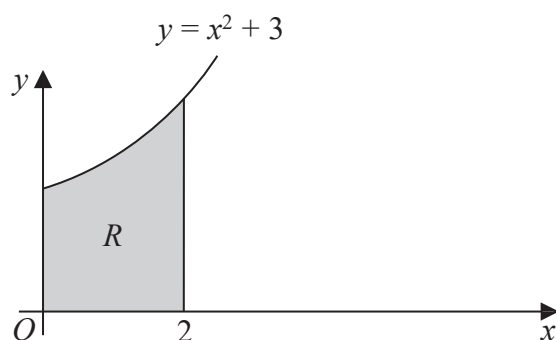


Figure 4

The shaded region R is bounded by part of the curve with equation $y = x^2 + 3$, the x -axis, the y -axis and the line with equation $x = 2$, as shown in Figure 4. The unit of length on each axis is one centimetre. The region R is rotated through 2π radians about the x -axis to form a uniform solid S .

Using algebraic integration,

(a) show that the volume of S is $\frac{202}{5}\pi \text{ cm}^3$, (4)

(b) show that, to 2 decimal places, the centre of mass of S is 1.30 cm from O . (5)

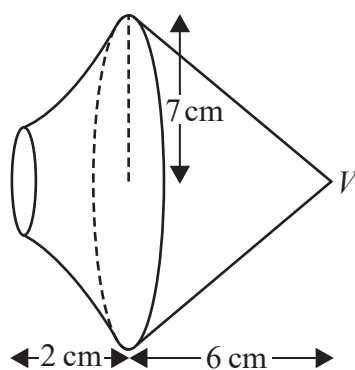


Figure 5

A uniform right circular solid cone, of base radius 7 cm and height 6 cm, is joined to S to form a solid T . The base of the cone coincides with the larger plane face of S , as shown in Figure 5. The vertex of the cone is V .

The mass per unit volume of S is twice the mass per unit volume of the cone.

(c) Find the distance from V to the centre of mass of T . (5)

The point A lies on the circumference of the base of the cone. The solid T is suspended from A and hangs freely in equilibrium.

(d) Find the size of the angle between VA and the vertical. (3)

