

**GENERAL CERTIFICATE OF SECONDARY EDUCATION**  
**MATHEMATICS C (GRADUATED ASSESSMENT)**  
MODULE M9 – SECTION B

## B279B

Candidates answer on the question paper

**OCR Supplied Materials:**  
None

**Other Materials Required:**

- Geometrical instruments
- Tracing paper (optional)
- Scientific or graphical calculator

**Monday 9 March 2009**  
**Morning**

**Duration: 30 minutes**



Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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**INSTRUCTIONS TO CANDIDATES**

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Show all your working. Marks may be given for a correct method even if the answer is incorrect.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

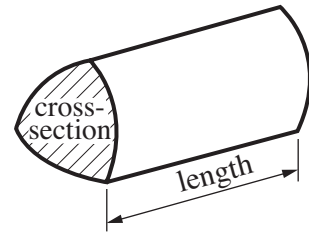
**INFORMATION FOR CANDIDATES**

- The number of marks is given in brackets [ ] at the end of each question or part question.
- Section B starts with question 7.
- You are expected to use a calculator in Section B of this paper.
- Use the  $\pi$  button on your calculator or take  $\pi$  to be 3.142 unless the question says otherwise.
- The total number of marks for this Section is **25**.
- This document consists of **8** pages. Any blank pages are indicated.

<b>FOR EXAMINER'S USE</b>	
<b>SECTION B</b>	

## Formulae Sheet

**Volume of prism** = (area of cross-section)  $\times$  length

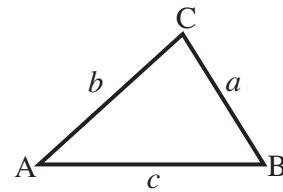


**In any triangle ABC**

**Sine rule**  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

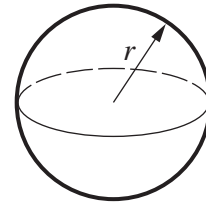
**Cosine rule**  $a^2 = b^2 + c^2 - 2bc \cos A$

**Area of triangle** =  $\frac{1}{2} ab \sin C$



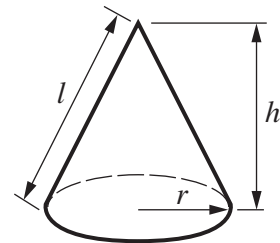
**Volume of sphere** =  $\frac{4}{3} \pi r^3$

**Surface area of sphere** =  $4\pi r^2$



**Volume of cone** =  $\frac{1}{3} \pi r^2 h$

**Curved surface area of cone** =  $\pi r l$



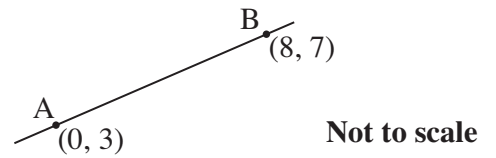
**The Quadratic Equation**

The solutions of  $ax^2 + bx + c = 0$ ,  
where  $a \neq 0$ , are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

**PLEASE DO NOT WRITE ON THIS PAGE**

7 A is the point (0, 3) and B is the point (8, 7).



(a) Calculate the length of AB.

(a) ..... [3]

(b) (i) Find the gradient of the line AB.

(b)(i) ..... [1]

(ii) Hence find the equation of the line perpendicular to AB and passing through A.

(ii) ..... [2]

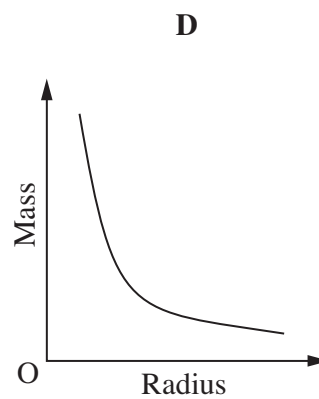
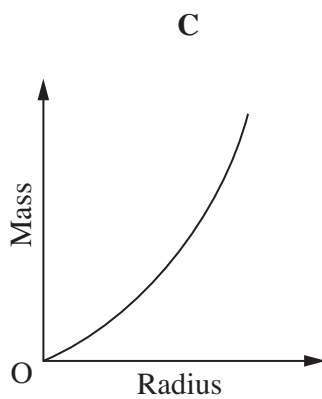
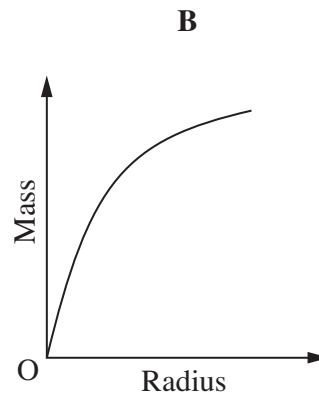
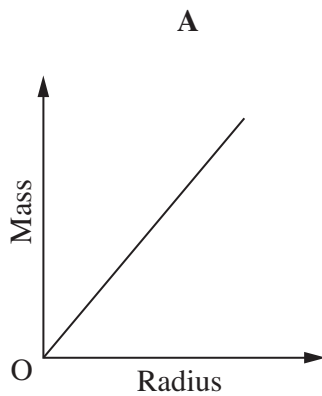
- 8 (a) A set of cones all have the same height.

The mass,  $M$  grams, of each cone is directly proportional to the square of its base radius,  $r$  cm. One of these cones has base radius 6 cm and mass 2700 grams.

- (i) Find an equation for  $M$  in terms of  $r$ .

(a)(i) ..... [3]

- (ii) Which of the graphs **A**, **B**, **C** or **D** represents the relationship between the mass and radius of these cones?



(ii) ..... [1]

(b) The volume of a cone is given by the formula  $V = \frac{\pi r^2 h}{3}$ .

Rearrange this formula to make  $r$  the subject.

(b) ..... [3]

9 This table shows the number of students in each year group of a school.

Year group	Number of students
7	312
8	230
9	200
10	208
11	250
Total	1200

Teresa is conducting a survey about the lunchtime facilities at the school. She decides to take a representative stratified sample of 100 students from the whole school.

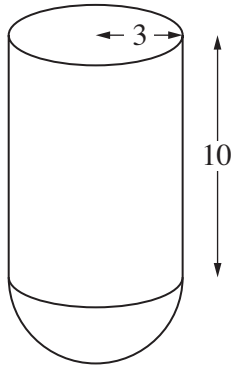
(a) Give an advantage of using a representative stratified sample.

.....  
.....  
..... [1]

(b) How many Year 7 students should be in this sample?

(b) ..... [2]

- 10 A lead weight is made from a cylinder and a hemisphere.  
They each have radius 3 cm, and the height of the cylinder is 10 cm.

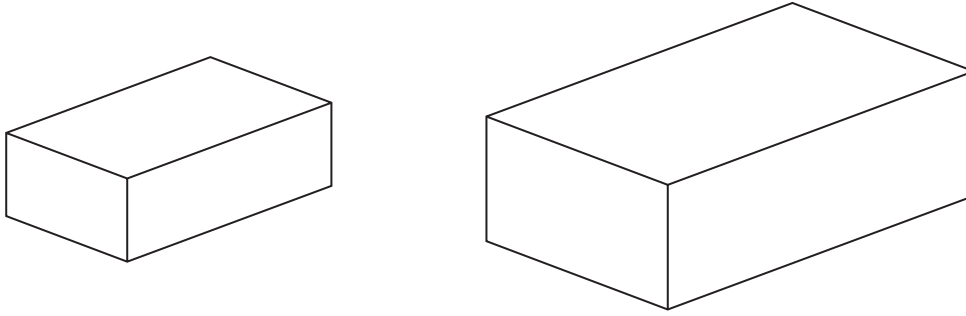


Calculate the volume of the lead weight.

..... cm<sup>3</sup> [5]

**TURN OVER FOR QUESTION 11**

- 11 These two cuboids are mathematically similar.  
The ratio of their volumes is 27 : 125.



- (a) Write down the ratio of the heights of the cuboids.

(a) ..... : ..... [1]

- (b) The surface area of the smaller cuboid is  $90 \text{ cm}^2$ .

Calculate the surface area of the larger cuboid.

(b) .....  $\text{cm}^2$  [3]

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