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M9

Monday 16 January 2012 – Morning

GCSE MATHEMATICS C (GRADUATED ASSESSMENT)

B279B MODULE M9 – SECTION B

B21658O112

Candidates answer on the Question Paper.

OCR supplied materials:
None

Other materials required:
- Geometrical instruments
- Tracing paper (optional)
- Scientific or graphical calculator

Duration: 30 minutes

B279B

Candidate forename		Candidate surname	

Centre number						Candidate number				

INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Show your working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Do **not** write in the bar codes.

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 8.
- You are expected to use a calculator in Section B of this paper.
- Use the π button on your calculator or take π 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.

This paper has been pre modified for carrier language

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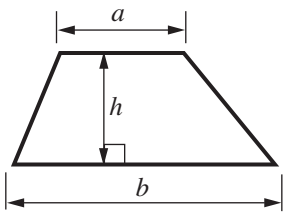
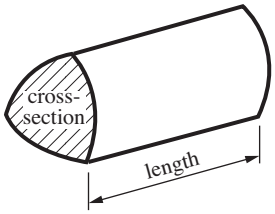
Formulae Sheet

Area of trapezium = $\frac{1}{2}(a + b)h$



Volume of prism = (area of cross-section) × length

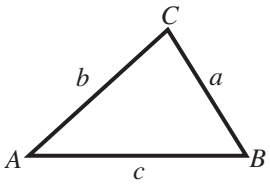


In any triangle ABC

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

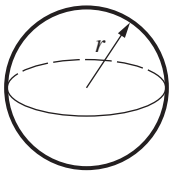
Cosine rule $a^2 = b^2 + c^2 - 2bc\cos A$

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



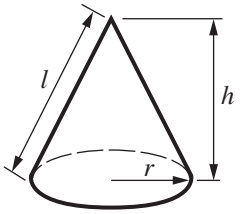
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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



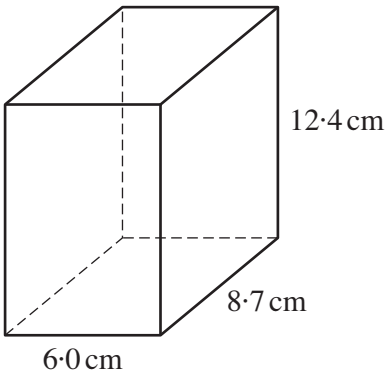
The Quadratic Equation

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

8 This box is a cuboid.
The dimensions of the box are 6·0 cm, 8·7 cm and 12·4 cm, all measured correct to the nearest 0·1 cm.



Calculate the upper bound of the volume of the box.

.....cm^3 **[2]**

9 Rearrange this formula to make x the subject.

$$y = \frac{x^3 - 3}{2}$$

..... **[3]**

10 Mia and Paul are conducting a survey about students' opinions of school lunches.
They each survey 50 students.

(a) Mia surveys the first 50 students in the lunch queue.

Explain why this is likely to be a biased sample.

.....

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

(b) Paul will survey a representative stratified sample of students from the different year groups.
The table shows the number of students in each year group.

Year	Number of students
7	240
8	210
9	180
10	150
11	120
Total	900

How many Year 7 students should Paul survey?

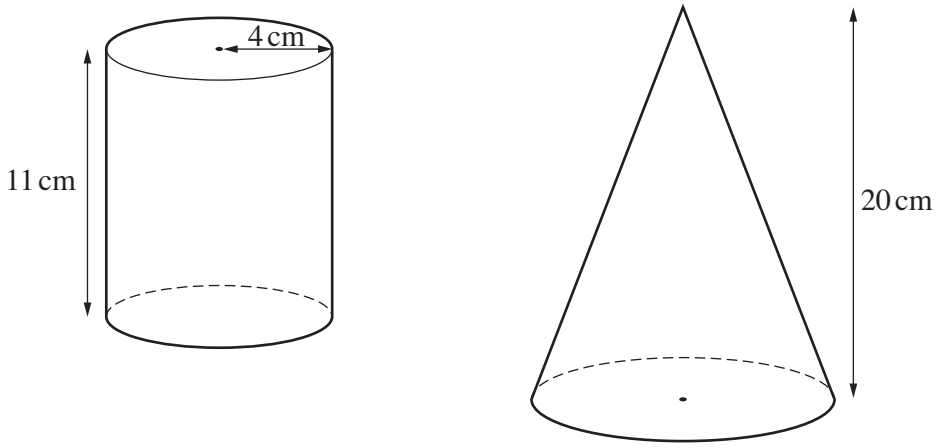
(b) ..... **[2]**

11 Simplify.

$$\frac{12x^3 - 21x}{3x}$$

..... **[2]**

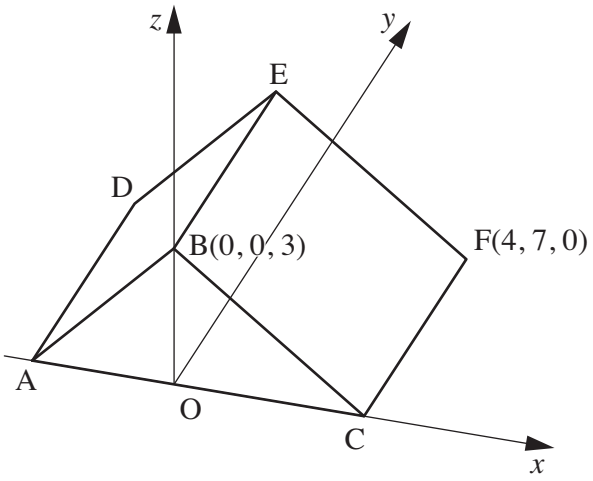
12 These two candles have the same volume.
The cylindrical candle has radius 4 cm and height 11 cm.
The conical candle has height 20 cm.



Calculate the radius of the base of the conical candle.

..... cm **[4]**

13 The cross-section of this prism is an isosceles triangle, with AB = CB.
The coordinates of B are (0, 0, 3) and of F are (4, 7, 0).



(a) Write down the coordinates of A and E.

(a) A (....., ..., ...)

E (....., ..., ...) **[2]**

(b) Calculate the length BF.

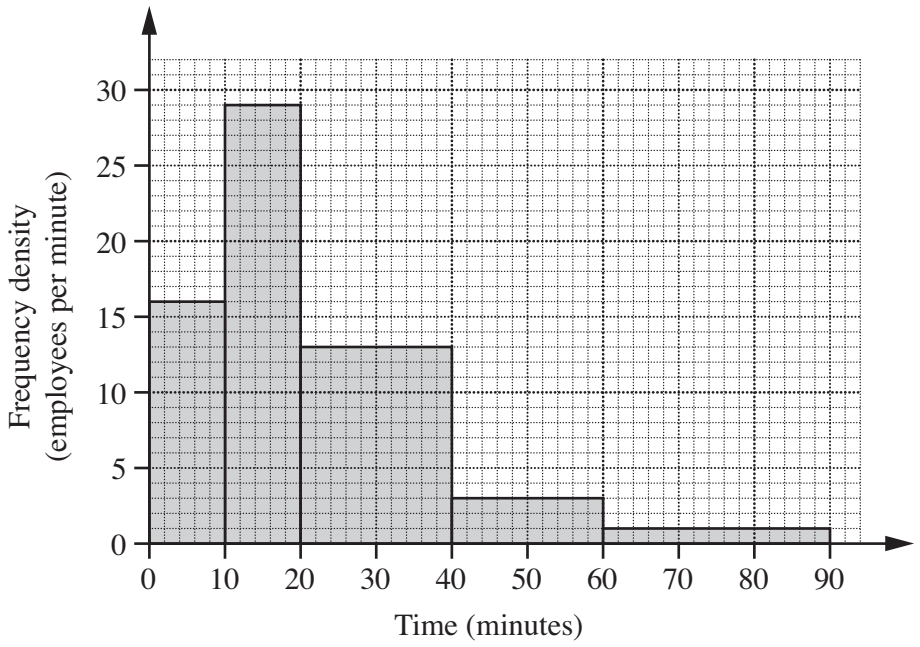
(b) ..... units **[2]**

(c) Calculate the angle between OE and the *y*-axis.

(c) .....° **[3]**

TURN OVER FOR QUESTION 14

14 Employees in a company are surveyed to find out about their journey times to work. This histogram shows the distribution of these times.



Find the percentage of these employees with a journey time of up to 20 minutes.

.....% **[4]**