

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

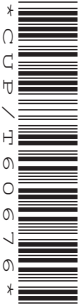
M9

TUESDAY 24 JUNE 2008

Morning
 Time: 30 minutes

Candidates answer on the question paper
Additional materials (enclosed): None

Additional materials (required):
 Geometrical instruments
 Tracing paper (optional)



Candidate Forename

Candidate Surname

Centre Number

Candidate Number

INSTRUCTIONS TO CANDIDATES

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or 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 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.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this Section is **25**.



WARNING

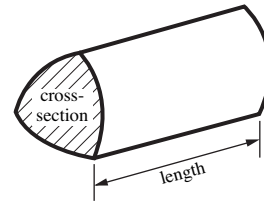
You are not allowed to use a calculator in Section A of this paper.

FOR EXAMINER'S USE	
SECTION A	
SECTION B	
TOTAL	

This document consists of **8** printed pages.

Formulae Sheet

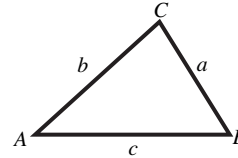
Volume of prism = (area of cross-section) \times length



In any triangle ABC

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

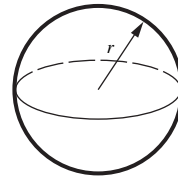
Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$



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

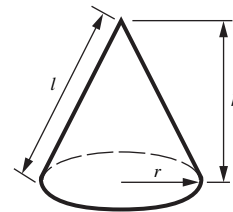
Volume of sphere = $\frac{4}{3}\pi r^3$

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

1 (a) Solve, by factorising.

$$x^2 + 2x - 15 = 0$$

(a)..... [3]

(b) Simplify.

$$\frac{6x^2 + 4x}{2x}$$

(b) [2]

- 2 (a) The population of the USA in 2005 was 2.8×10^8 .
The total area of the USA is $9.4 \times 10^6 \text{ km}^2$.

The population density of the USA, in people per km^2 , was

$$\frac{2.8 \times 10^8}{9.4 \times 10^6}$$

Estimate the answer to this calculation.

Show any approximations you use in your working.

(a)people per km^2 [2]

- (b) The area of North Korea is $121\,000 \text{ km}^2$, correct to 3 significant figures.
The area of South Korea is $99\,300 \text{ km}^2$, correct to 3 significant figures.

Calculate the upper bound of the total area of North Korea and South Korea.

(b) km^2 [2]

3 Rearrange this formula to make x the subject.

$$y = 3x^2 + 4$$

..... [3]

4 Work out.

(a) 5^0

(a) [1]

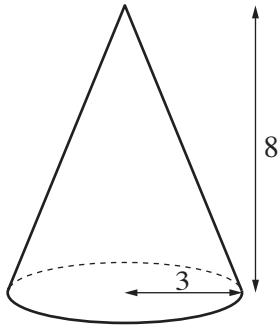
(b) 5^{-2}

(b) [1]

(c) $400^{\frac{1}{2}}$

(c)..... [1]

- 5 Cone A has base radius 3 cm and height 8 cm.



- (a) Calculate the volume of cone A.
Give your answer in the form $k\pi$, where k is an integer.

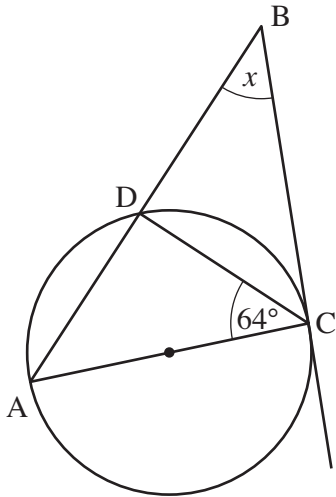
(a)..... cm^3 [2]

- (b) The total surface area of cone A is 109 cm^2 , correct to 3 significant figures.
Cone B is mathematically similar to cone A but double the height.

Calculate the total surface area of cone B.

(b) cm^2 [2]

6



Not to scale

AC is a diameter of the circle.
 BC is a tangent to the circle.
 AB is a straight line which intersects the circle at D.
 Angle DCA = 64° .

Work out angle x .
 Give a reason for each step of your working.

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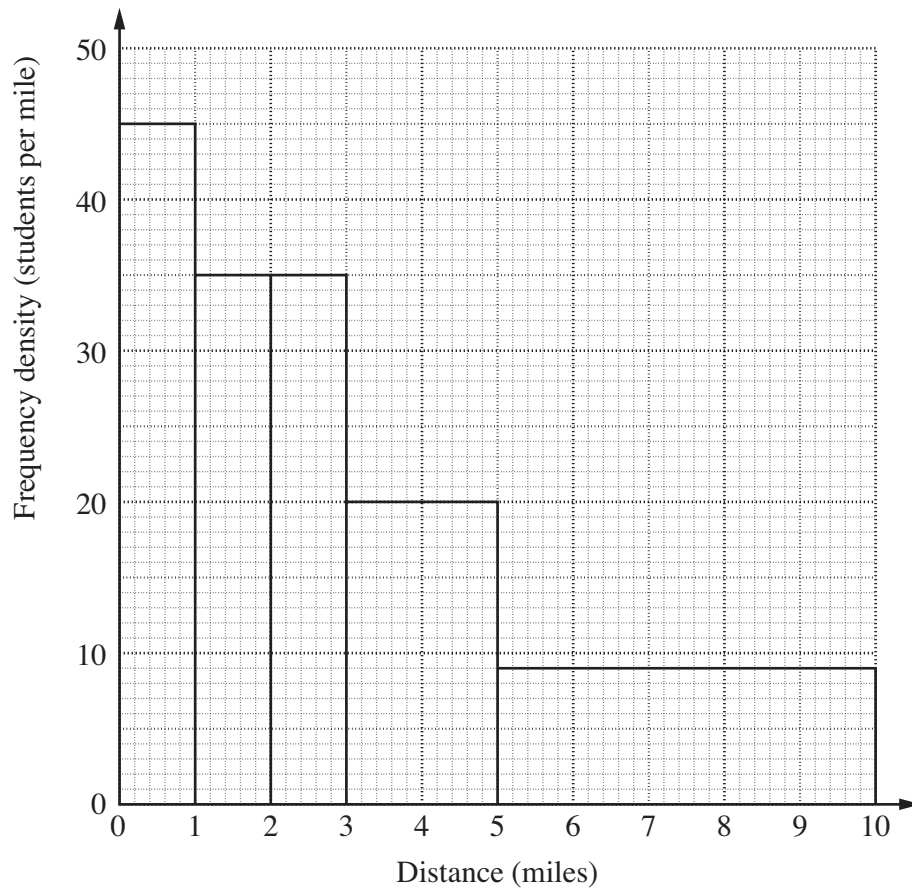
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..... [3]

TURN OVER FOR QUESTION 7

7 The histogram shows the distribution of the distances that students travel to a college.



What percentage of students travel less than 2 miles to the college?

.....% [3]

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