B279B

GENERAL CERTIFICATE OF SECONDARY EDUCATION

MATHEMATICS C (GRADUATED ASSESSMENT)

MODULE M9 – SECTION B

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)
Scientific or graphical calculator

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**.
*   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.

FOR EXAMINER'S USE

SECTION B	

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

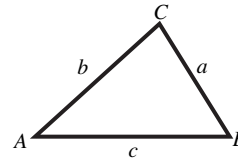**[Turn over**

Formulae Sheet

Volume of prism = (area of cross-section) ×length
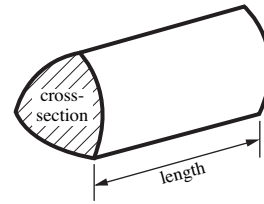
In any triangle *ABC*

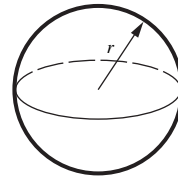**Sine rule** $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

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

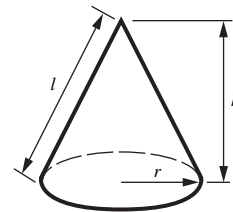**Area of triangle** = $\frac{1}{2} ab \sin C$

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

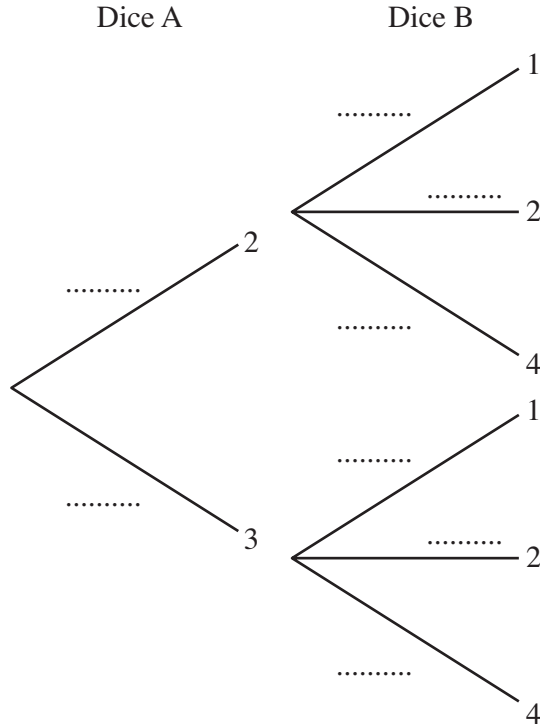The solutions of $ax^2 + bx + c = 0$, where $a \neq 0$, are given by

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

PLEASE DO NOT WRITE ON THIS PAGE

8 Mike is playing a game with two fair six-sided dice, A and B.
The faces of dice A are numbered 2, 2, 2, 2, 3, 3.
The faces of dice B are numbered 1, 1, 2, 4, 4, 4.
Mike throws the two dice.

(a) Use probabilities to complete the tree diagram.

Dice A   Dice B

```
                                          1
                    ..........
              2
    ..........        ..........          2

                        ..........
                                          4
                                          1
              3         ..........
    ..........
                        ..........        2

                        ..........
                                          4
```

[2]

(b) Calculate the probability that the number on dice A is **greater** than the number on dice B.

(b) .... [3]

[Turn over

9
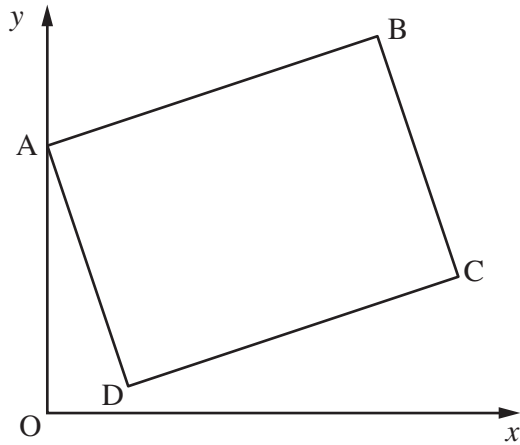
Not to scale

The diagram shows a rectangle ABCD.
A is the point (0, 4).
The equation of the line through D and C is $y = \frac{1}{3}x$.

Find the equation of the line

(a) through A and B,

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

(b) through A and D.

(b) .... [2]

10 **(a)** Expand and simplify.

$$(5x + 2)(4x - 1)$$

(a) .... [3]

(b) Factorise.

$$16x^2 - 9y^2$$

(b) .... [2]

[Turn over

11
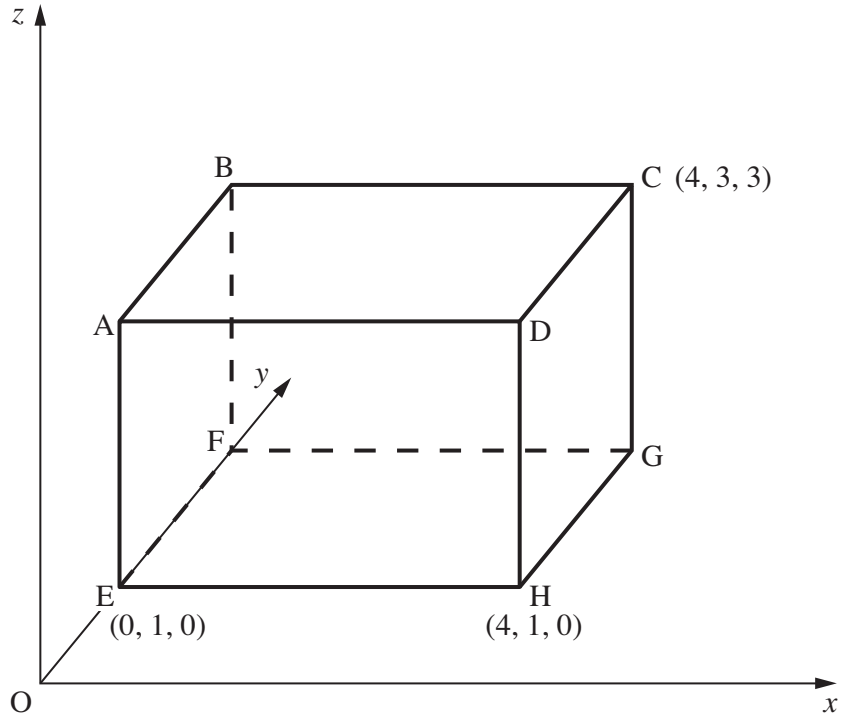
The diagram shows a cuboid with base EFGH.
C is at (4, 3, 3), E is at (0, 1, 0) and H is at (4, 1, 0).

(a) Find the coordinates of the midpoint of AH.

(a) (........., ..., ...) [2]

(b) Calculate the length EC.

(b) .... [3]

(c) Calculate angle CEG.

(c)...................................° [3]

12 This is a table of values for two variables, *x* and *y*.

x	0·2	0·4	0·5
y	60·0	15·0	9·6

Show that $y \propto \dfrac{1}{x^2}$.

....

....

....

.... [2]

TURN OVER FOR QUESTION 13

13 During one year, St Mary's maternity hospital recorded the ages of mothers having babies.

This table shows the distribution of their ages.

Age	Frequency
Under 20	115
20 to 29	245
30 to 39	324
40 and over	186
Total	870

To sample opinion about the service provided, a representative stratified sample of 50 of these mothers is to be interviewed.

Work out how many mothers aged 20 to 29 should be interviewed.
Show your method clearly.

.... [2]