MATHEMATICS C
(Graduated Assessment)

1966/2339A

MODULE M9 – SECTION A

Wednesday	**28 JUNE 2006**	Morning	30 minutes

Candidates answer on the question paper.
Additional materials:
    Geometrical instruments
    Tracing paper (optional)

Candidate
Name

Centre
Number

Candidate
Number

TIME   30 minutes

INSTRUCTIONS TO CANDIDATES

- Write your name, Centre number and candidate number in the boxes above.
- Answer **all** the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- In many questions marks will be given for a correct method even if the answer is incorrect.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.

INFORMATION FOR CANDIDATES

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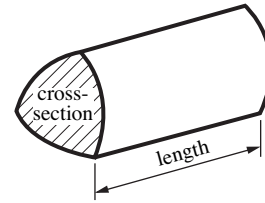- The total number of marks for this Section is 25.

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 question paper consists of 7 printed pages and 1 blank page.

[Turn over

Formulae Sheet

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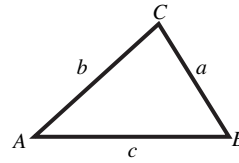

In any triangle *ABC*

Sine rule $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$
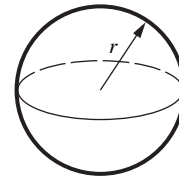
Cosine rule $a^2 = b^2 + c^2 - 2bc\cos A$

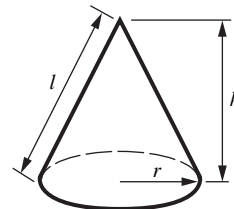**Area of triangle** $= \frac{1}{2}ab\sin C$

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

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

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1 This table shows the distribution of the times that 500 visitors spent in a theme park.

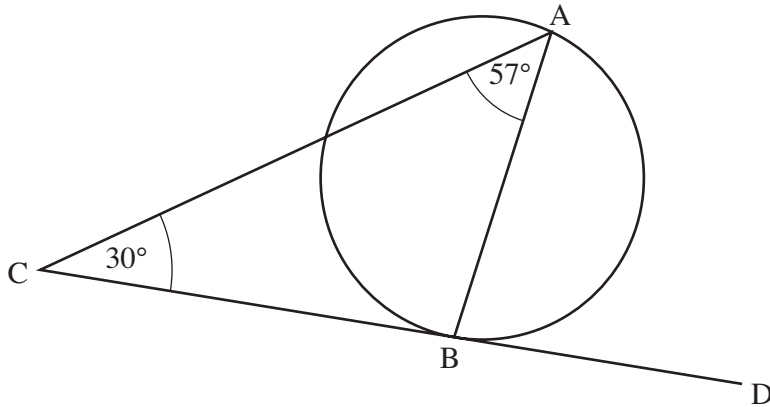| Time in hours (t)	Frequency
$0 < t \leqslant 2$	30
$2 < t \leqslant 4$	80
$4 < t \leqslant 5$	120
$5 < t \leqslant 6$	85
$6 < t \leqslant 7$	65
$7 < t \leqslant 10$	120

Draw a histogram to represent the data.
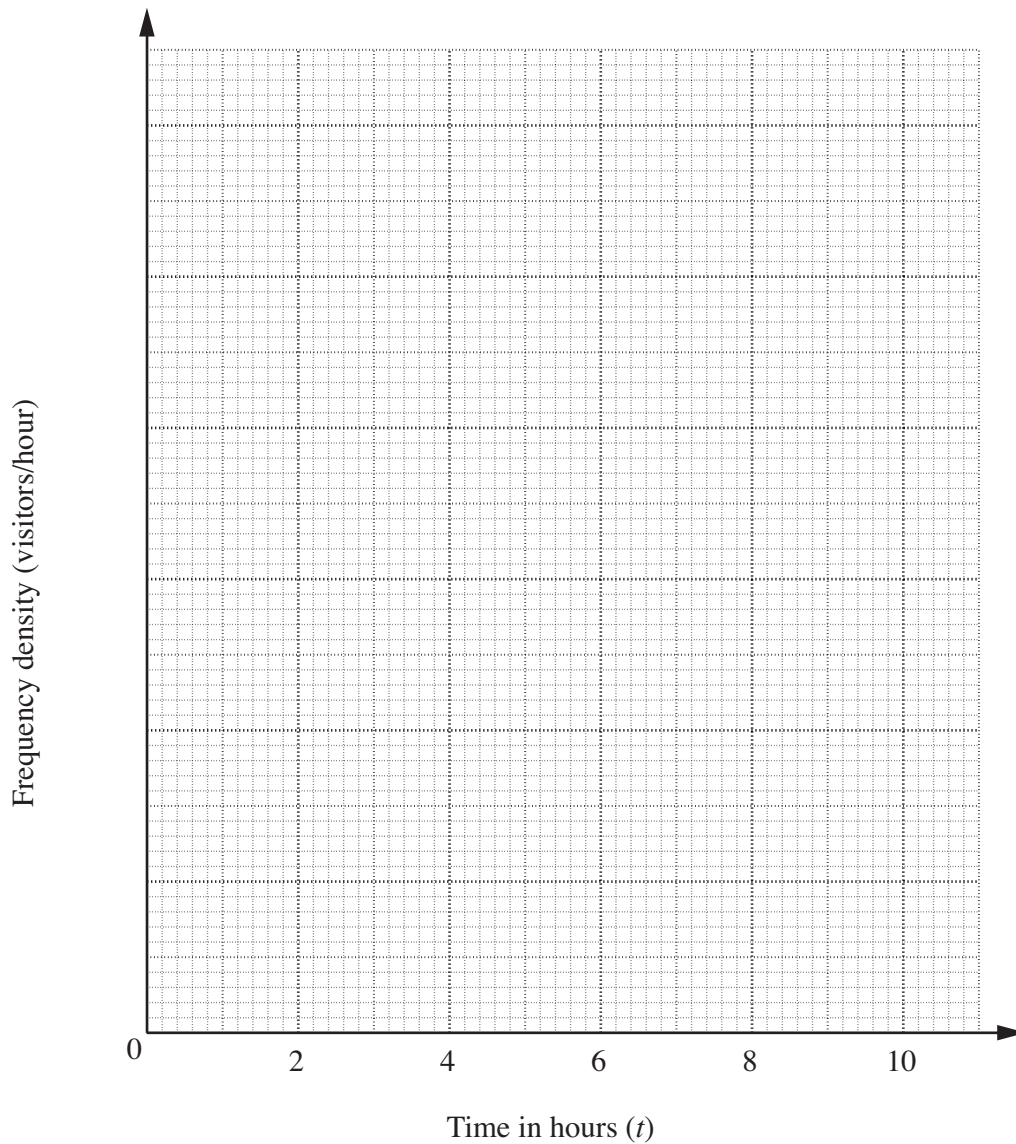
[3]

[**Turn over**

2 A and B are points on the circumference of a circle.
Tangent CD touches the circle at B.
Angle CAB = 57° and angle ACB = 30°.

Not to scale

Prove that AB is **not** a diameter of the circle.

....

....

....

....[2]

3 **Estimate** the answer to this calculation.

$$\frac{7 \cdot 8 \times 10^5}{2 \cdot 1 \times 10^3}$$

Show any approximations you use in your working.

....[2]

4 $y \propto \dfrac{1}{x^2}$ and $y = 9$ when $x = 2$.

   (a)   Find the equation connecting y and x.

(a) ....[2]

   (b)   Use the equation to find the **values** of x when $y = 1$.

(b) ....[2]

4	

5   Evaluate.

$$27^{\frac{1}{3}} \times 2^{-3}$$

Write your answer as a fraction.

....[3]

3	

[Turn over

6 **(a)** Complete this table for $y = x^3 + 2$.

x	$^-3$	$^-2$	$^-1$	0	1	2	3
y	$^-25$	$^-6$		2	3		29

[1]

(b) Draw the graph of $y = x^3 + 2$.
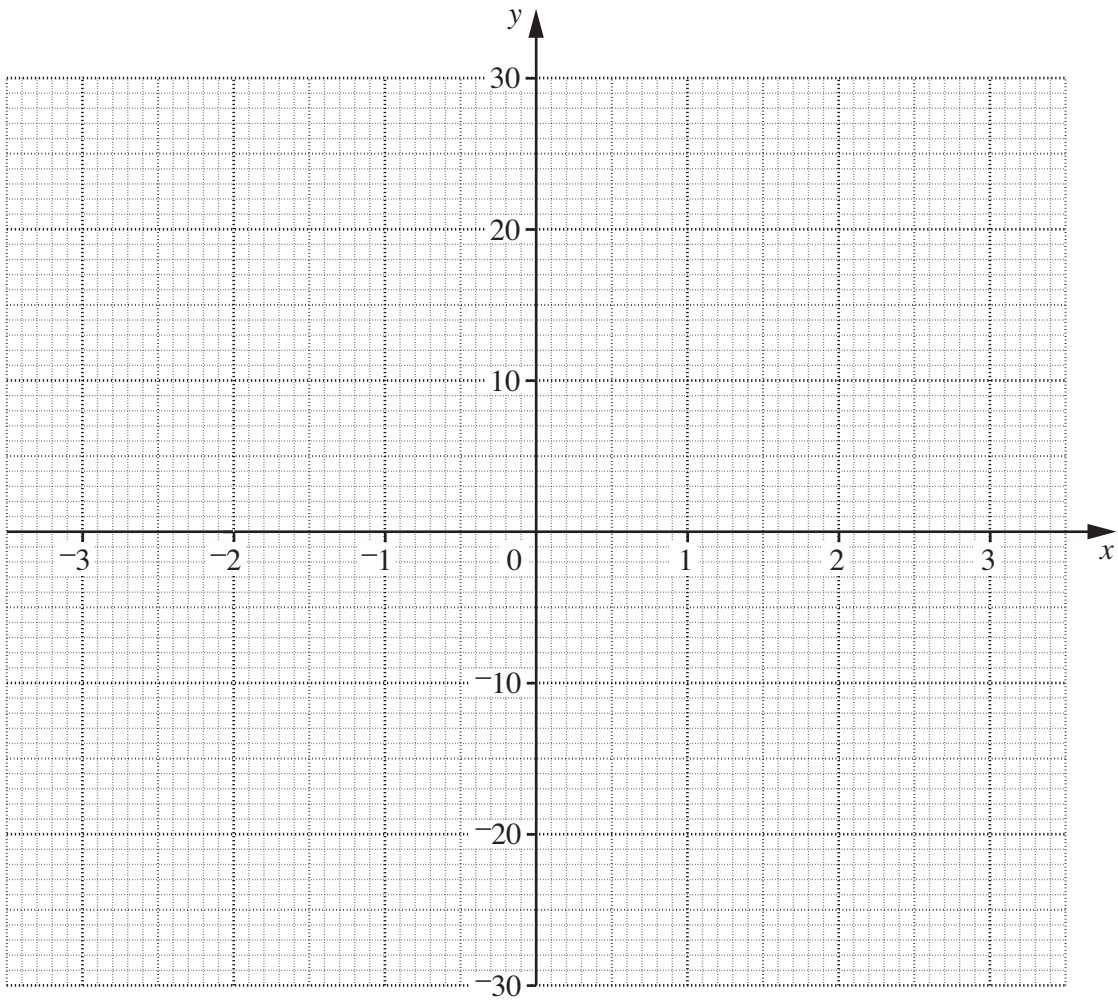
[2]

(c) The equation $x^3 + 2 = 7x$ can be solved by adding a straight line to the graph.

(i) Write down the equation of this line.

(c)(i) ....[1]

(ii) Draw this line on the graph and use it to solve the equation $x^3 + 2 = 7x$.

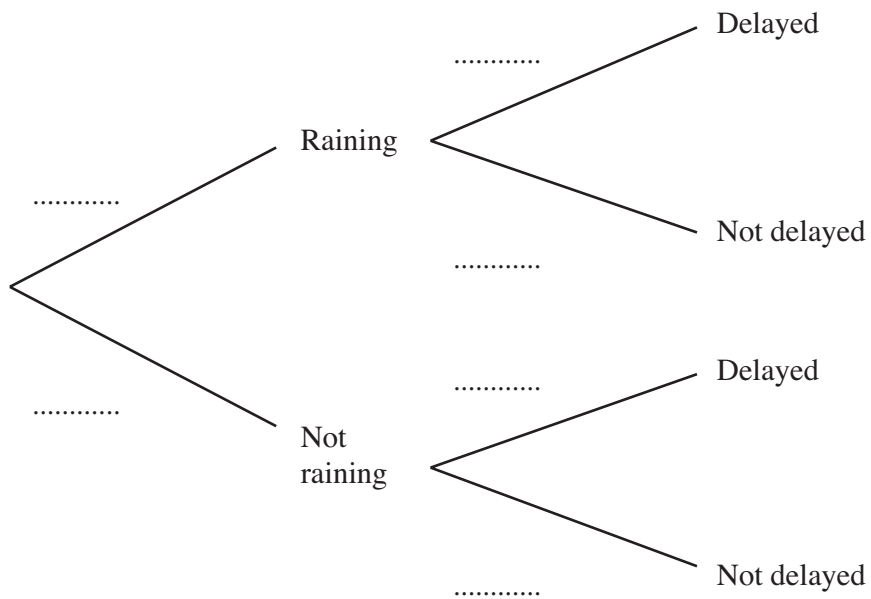**(ii)** ....[3]

7 Anne drives to work.
She estimates that in November it rains on one morning out of three.

She also estimates that:

- If it is raining the probability that she will be delayed is $\frac{3}{5}$.

- If it is not raining the probability that she will be delayed is $\frac{1}{5}$.

Use the tree diagram to calculate the probability that on one November morning Anne will be delayed.

```
                                    ........... Delayed
                          Raining <
            ...........  /          ........... Not delayed
                       /
                      <
            ...........  \          ........... Delayed
                          Not     <
                          raining
                                    ........... Not delayed
```

....[4]

4

8

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