OCR

RECOGNISING ACHIEVEMENT

OXFORD CAMBRIDGE AND RSA EXAMINATIONS

General Certificate of Secondary Education

MATHEMATICS C
(Graduated Assessment)

1966/2343A

HIGHER TERMINAL PAPER – SECTION A

Monday **5 JUNE 2006** Afternoon 1 hour

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

Candidate Name	

Centre Number						Candidate Number				

TIME 1 hour

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 50.

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

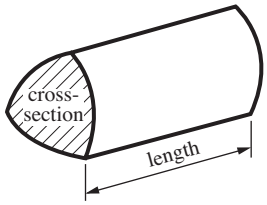
FOR EXAMINER'S USE	
Section A	
Section B	
TOTAL	

This question paper consists of 11 printed pages and 1 blank page.

[Turn over

Formulae Sheet: Higher Tier

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

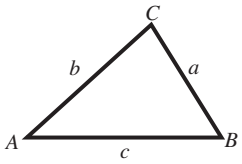


In any triangle ABC

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

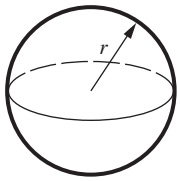
Cosine rule $a^2 = b^2 + c^2 - 2bc\cos A$

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



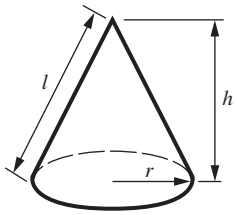
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

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



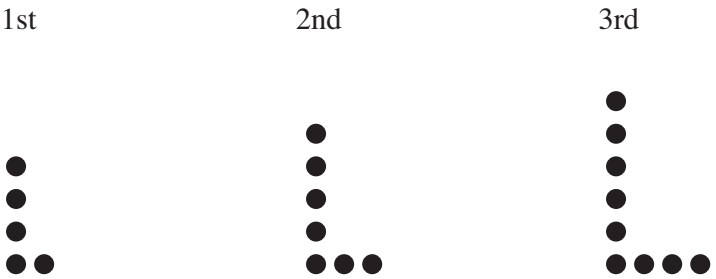
The Quadratic Equation

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

1 **(a)** These are the first three shapes in a sequence.



Find an expression for the number of dots in the nth shape in this sequence.

(a) .....[2]

(b) Expand and simplify.

$$2(3x + 1) + 5(2x - 3)$$

(b) .....[2]

(c) Factorise.

$$x^2 - 7x + 10$$

(c) .....[2]

6

2 **(a)** Work out.

$$2\tfrac{1}{2} + 1\tfrac{1}{3}$$

(a) .....[3]

(b) Which one of these fractions will convert to a recurring decimal?

$$\frac{1}{5} \quad \frac{1}{7} \quad \frac{1}{8} \quad \frac{1}{20}$$

(b) .....[1]

(c) Express $0{\cdot}\dot{2}\dot{4}$ as a fraction in its simplest form.

(c) .....[2]

6

3 **Estimate** the answer to $\dfrac{8{\cdot}28 \times 10^{3}}{3{\cdot}79 \times 10^{-2}}$.

Show clearly the values you use.

.....[3]

3

4 **(a)** Write down all the integer values of n which satisfy this inequality.

$$^{-}5 < 3n \leqslant 12$$

(a) .....[3]

(b) Solve, algebraically, these simultaneous equations.

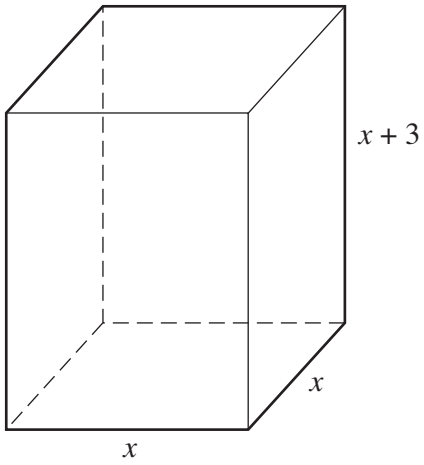
$$3x - 2y = 19$$
$$2x + y = 8$$

(b) x = ...

y = ...[3]

6

5 All the lengths in this question are in metres.



The diagram shows a cuboid.

(a) Show that the volume, V, of the cuboid is $V = x^3 + 3x^2$.

.....

.....

.....

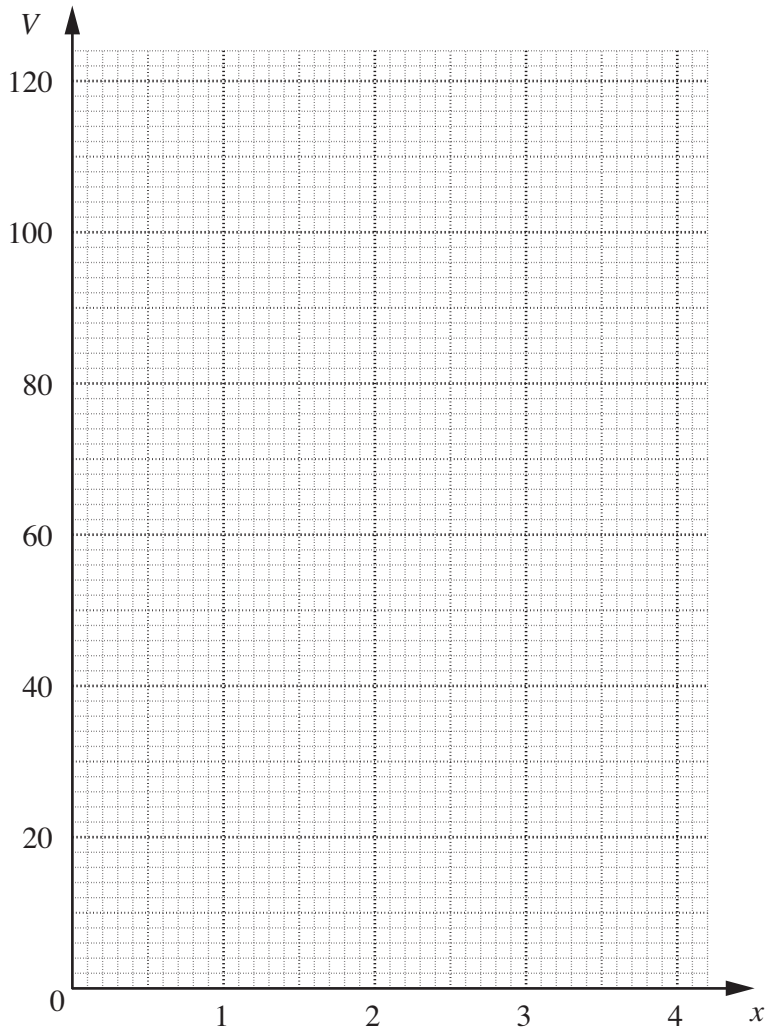
.....[2]

(b) Complete the table for $V = x^3 + 3x^2$.

x	0	1	2	3	4
V	0	4	20	54	

[1]

(c) Draw the graph of $V = x^3 + 3x^2$ on the grid below.



[2]

(d) The volume of the cuboid is $30\,m^3$.

Use your graph to find the length of the side x.

(d) .....m [1]

6

6 **(a)** Rearrange $y = 5x - 3$ to make x the subject.

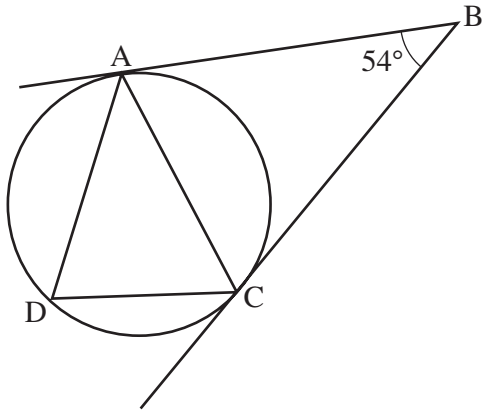
(a) .....[2]

(b) Rearrange $c(d - 3) = 2d + 5c$ to make d the subject.

(b) .....[4]

6

7 A, C and D are points on a circle.
BA and BC are tangents to the circle.
Angle ABC = 54°.



Not to scale

Calculate angle ADC, giving a reason for each step of your calculation.

.....

.....

.....

.....

.....

.....

.....[4]

4

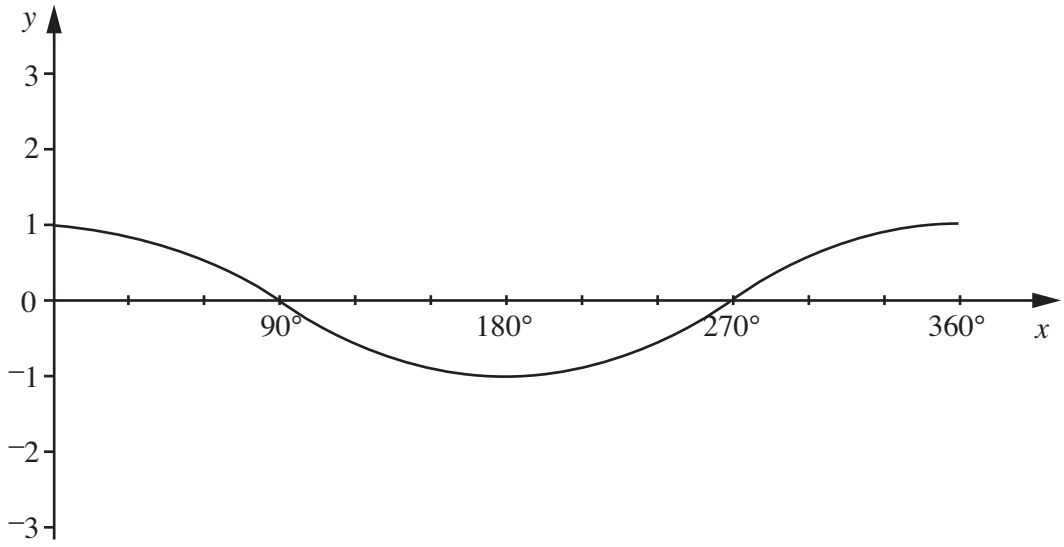
8 Work out.

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

.....[2]

2

9 This is the graph of $y = \cos x$ for $0° \leqslant x \leqslant 360°$.



(a) Given that $\cos 50° = 0{\cdot}64$, write down the values of x between $0°$ and $360°$ for which $\cos x = {}^{-}0{\cdot}64$.

(a) .....[2]

(b) On the diagram above, sketch the graph of $y = \cos 3x$. [2]

4

10 Solve.

$$\frac{2}{x+4} + \frac{5}{4x-5} = 1$$

.....[7]

7

BLANK PAGE

PLEASE DO NOT WRITE ON THIS PAGE