OCR
RECOGNISING ACHIEVEMENT

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
General Certificate of Secondary Education

MATHEMATICS C
(Graduated Assessment)

1966/2340B

MODULE M10 – SECTION B

Wednesday **29 JUNE 2005** Morning 30 minutes

Candidates answer on the question paper.
Additional materials:
Geometrical instruments
Scientific or graphical calculator

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.
- Write your answers on the dotted lines unless the question says otherwise.
- 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.
- There is a space after most questions. Use it to do your working. 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 in the grey area between the pages.
- **DO NOT** WRITE IN THE AREA **OUTSIDE** THE BOX BORDERING EACH PAGE. ANY WRITING IN THIS AREA WILL NOT BE MARKED.

INFORMATION FOR CANDIDATES

- You are expected to use a calculator in Section B of this paper.
- 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 7.
- Use the π button on your calculator or take π to be 3·142 unless the question says otherwise.

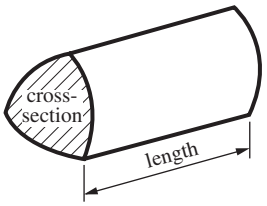
FOR EXAMINER'S USE	
Section B	

This question paper consists of 8 printed pages.

[Turn over

Formulae Sheet

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

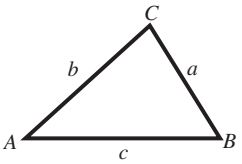


In any triangle *ABC*

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

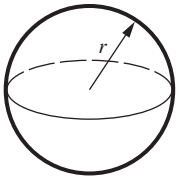
Cosine rule $a^2 = b^2 + c^2 - 2bc\cos A$

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



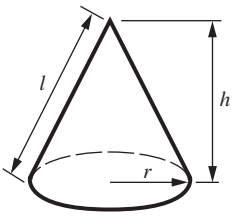
Volume of sphere = $\frac{4}{3}\pi r^3$

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

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

7 In 1990 the population of animals in a colony was 640.
The population, P, after t years is given by the equation $P = 640 \times 0{\cdot}9^t$.

(a) By what percentage is the population changing each year?

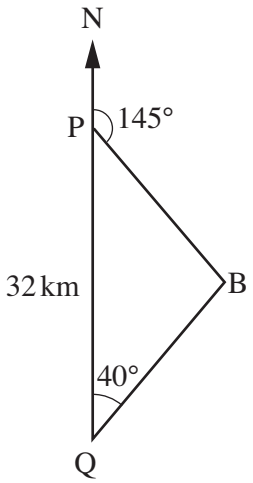
(a) .....% [1]

(b) Work out an estimate of the population in 2015.

(b) .....[2]

3

8 Two coastguard stations, P and Q, are 32 kilometres apart.
Q is due south of P.
A boat, B, is on a bearing of 145° from P and 040° from Q.



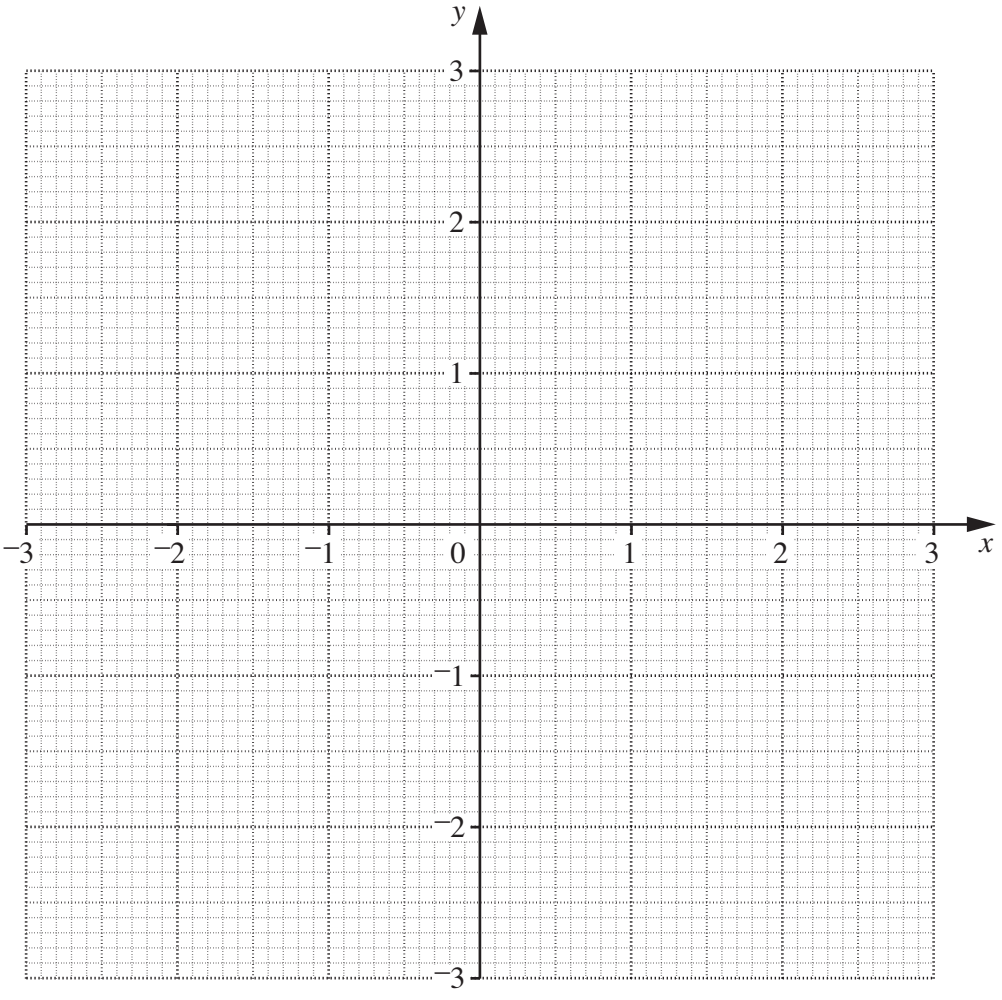
Not to scale

Calculate the distance QB.

.....km [3]

3

9 **(a)** **(i)** Draw the graphs of $x^2 + y^2 = 4$ and $y = 2x + 1$.



[3]

(ii) The graphs intersect at two points.

Write down the coordinates of these points.
Give your answers correct to 1 decimal place.

(a)(ii) (..... , ...)

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

(b) Solve, algebraically, these simultaneous equations.
Give your answers correct to 2 decimal places.

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

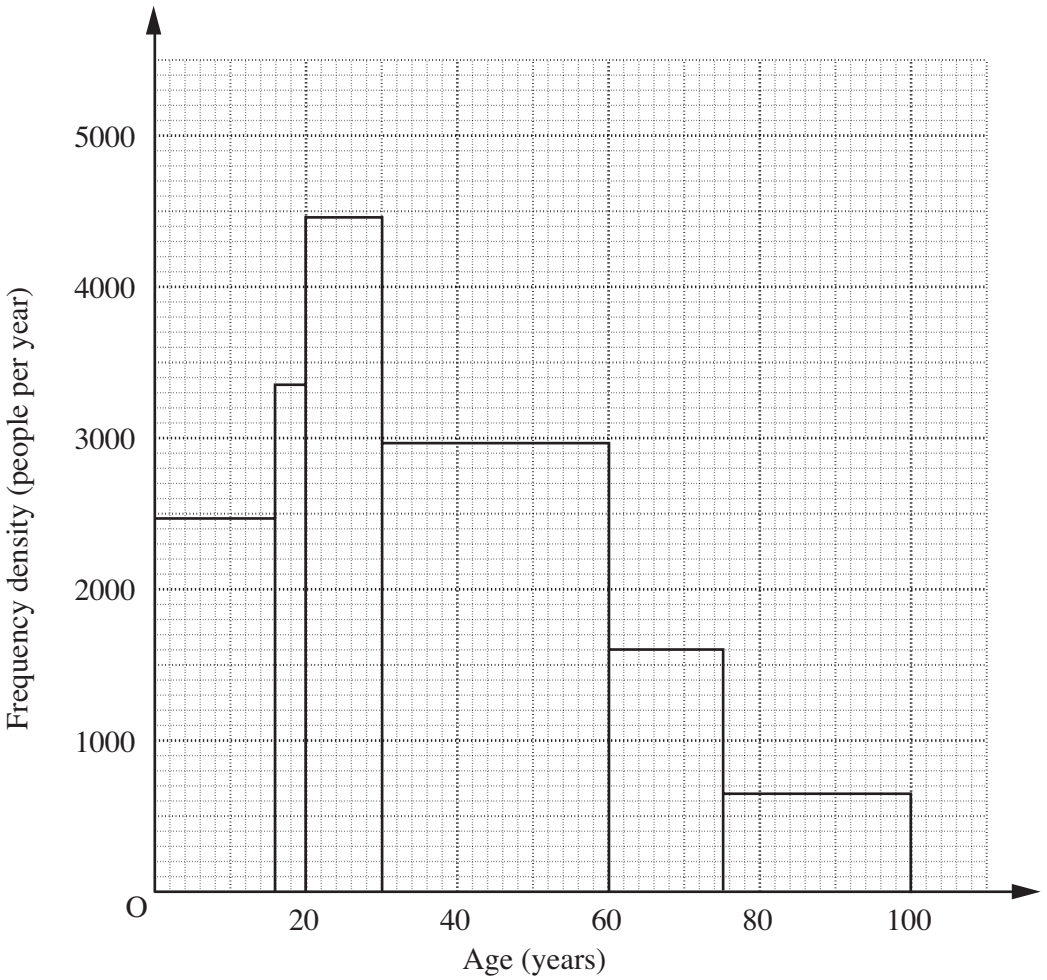
$$y = 2x + 1$$

(b) x = ... y = ...

x = ... y = ... [6]

11

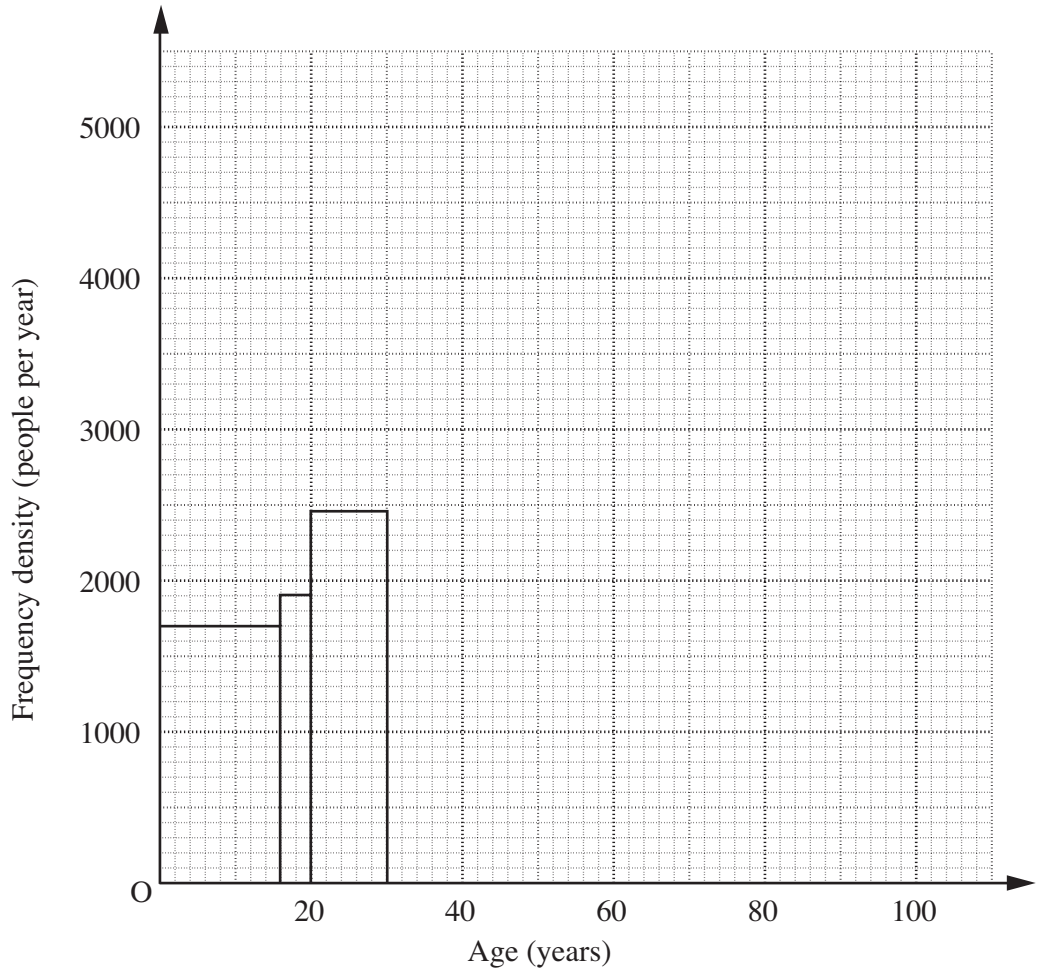
10 The histogram below shows the distribution of ages of people in Southampton in 2001.



The table shows the distribution of ages of people in Bournemouth in 2001.

Age (t years)	Number of people (to the nearest hundred)
$0 \leqslant t < 16$	27 200
$16 \leqslant t < 20$	7 600
$20 \leqslant t < 30$	24 700
$30 \leqslant t < 60$	61 800
$60 \leqslant t < 75$	23 100
$75 \leqslant t < 100$	18 800

(a) On the grid below, complete the histogram to show the distribution of ages of people in Bournemouth in 2001.



[2]

(b) Tom wants to know which of the two places has the larger population.

Explain how he can tell from the histograms without doing any calculations.

.....

.....[1]

(c) Make one comparison between the distribution of ages in Southampton and Bournemouth.

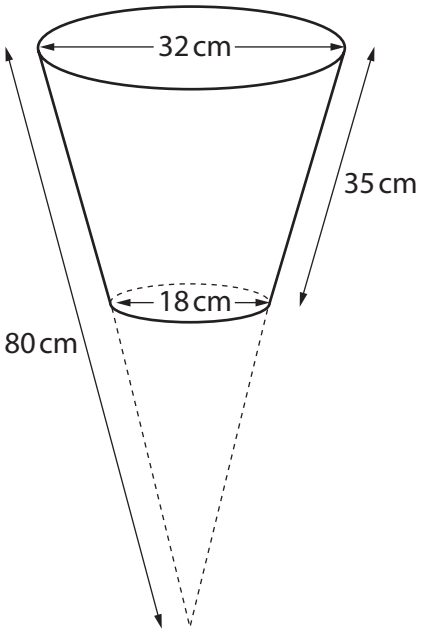
.....

.....[1]

4

TURN OVER FOR QUESTION 11

11 This metal rubbish bin is the frustum of a hollow cone.
It is open at the top and closed at the bottom.



Calculate the total surface area of the outside of the bin.

.....cm^2 [4]

4