

Oxford Cambridge and RSA Examinations

General Certificate of Secondary Education

Mathematics C (Graduated Assessment)
 HIGHER TIER TERMINAL PAPER – SECTION B

1966/2343B (H)

Specimen Paper 2003

Additional materials:

Tracing paper
 Geometrical instruments
 Scientific or Graphical Calculator

TIME 1 hour

Candidate Name		Centre Number		Candidate Number								
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INSTRUCTIONS TO CANDIDATES

- Write your name, Centre number and candidate number in the boxes above.
- Answer **all** the questions.
- Write your answers, in blue or black ink, in the spaces provided on the question paper.
- 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 correct working even if the answer is incorrect.

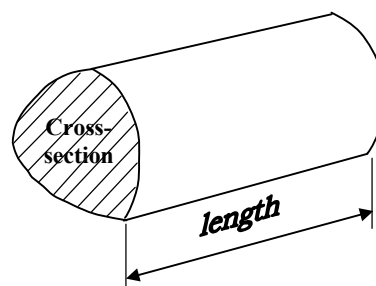
INFORMATION FOR CANDIDATES

- 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 mark available for this Section is 50.

For Examiners' Use	
Section B	

FORMULA SHEET: HIGHER TIER

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

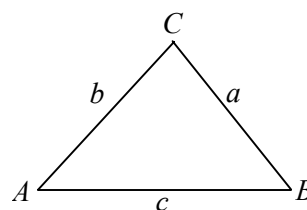


In any triangle ABC

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

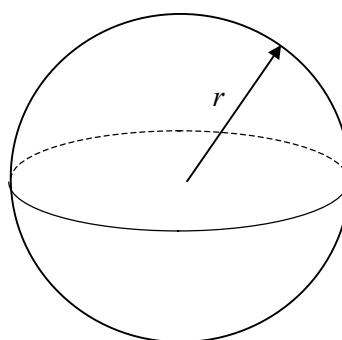
Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$

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



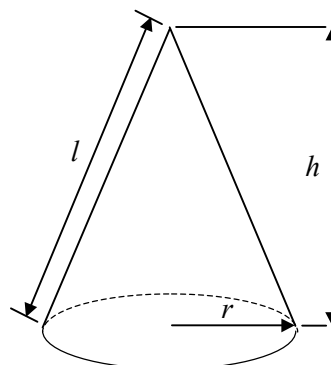
Volume of sphere = $\frac{4}{3}\pi r^3$

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 solution of $ax^2 + bx + c = 0$ where $a \neq 0$, area given by $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

13 (a) Calculate $100 - \sqrt{5 \times 5 \cdot 12 - 9 \cdot 6}$.

(a) _____ [1]

(b) Calculate the following.

The sum of the cube of 12.5 and
the square of 4.5
is divided by the difference
between 2.54 and the reciprocal
of 2.5

(b) _____ [1]

2	
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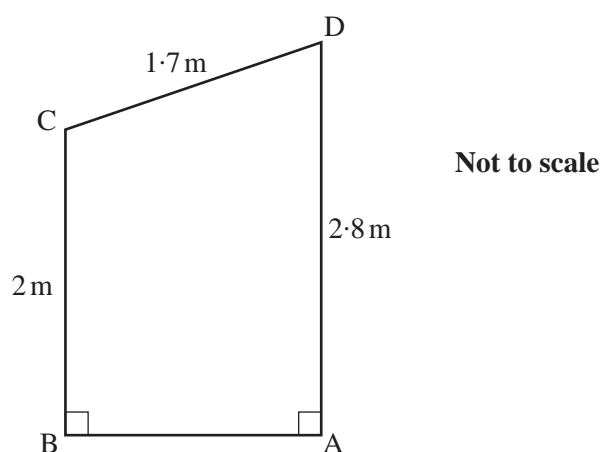
14 The equation $x^3 - 2x - 1 = 0$ has a solution between 1 and 2.

Use trial and improvement to find the solution correct to two decimal places.
You must show your trials.

$x =$ _____ [4]

4	
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- 15** The diagram shows the end, ABCD, of a shed.
The shed is standing on horizontal ground.

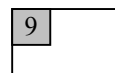


- (a)** Calculate the area of ABCD.

(a) _____ m^2 [6]

- (b)** Calculate the angle CD makes with the horizontal.

(b) _____ $^\circ$ [3]



- 16** Mrs Bates invested some money in a savings account.
The rate of interest was fixed at 7% per annum.
Interest was added at the end of each year.
At the end of the third year there was £3675.13 in the account.

How much did Mrs Bates invest?

£ _____ [3]

3	

- 17 (a)** Ten years ago the population of Japan was 1.15×10^8 .
The population is now 1.1983×10^8 .

Calculate the percentage increase in the population.

(a) _____ % [2]

- (b)** The table shows the populations of three countries.

Country	Population
France	6.12×10^7
Finland	7.24×10^6
U.S.A.	2.16×10^8

- (i)** Calculate the total population of the three countries.
Give your answer to a reasonable degree of accuracy.

(b)(i) _____ [2]

- (ii)** The area of France is 213 000 square miles.

Calculate the average number of people per square mile in France.

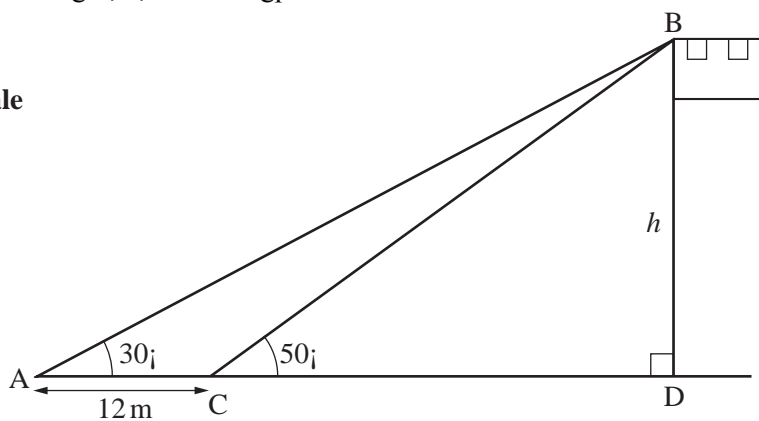
(ii) _____ [2]

6	

- 18 The diagram shows a vertical flagpole of height h metres, standing on horizontal ground.

Calculate the height, h , of the flagpole.

Not to scale



$h =$ _____ m [5]

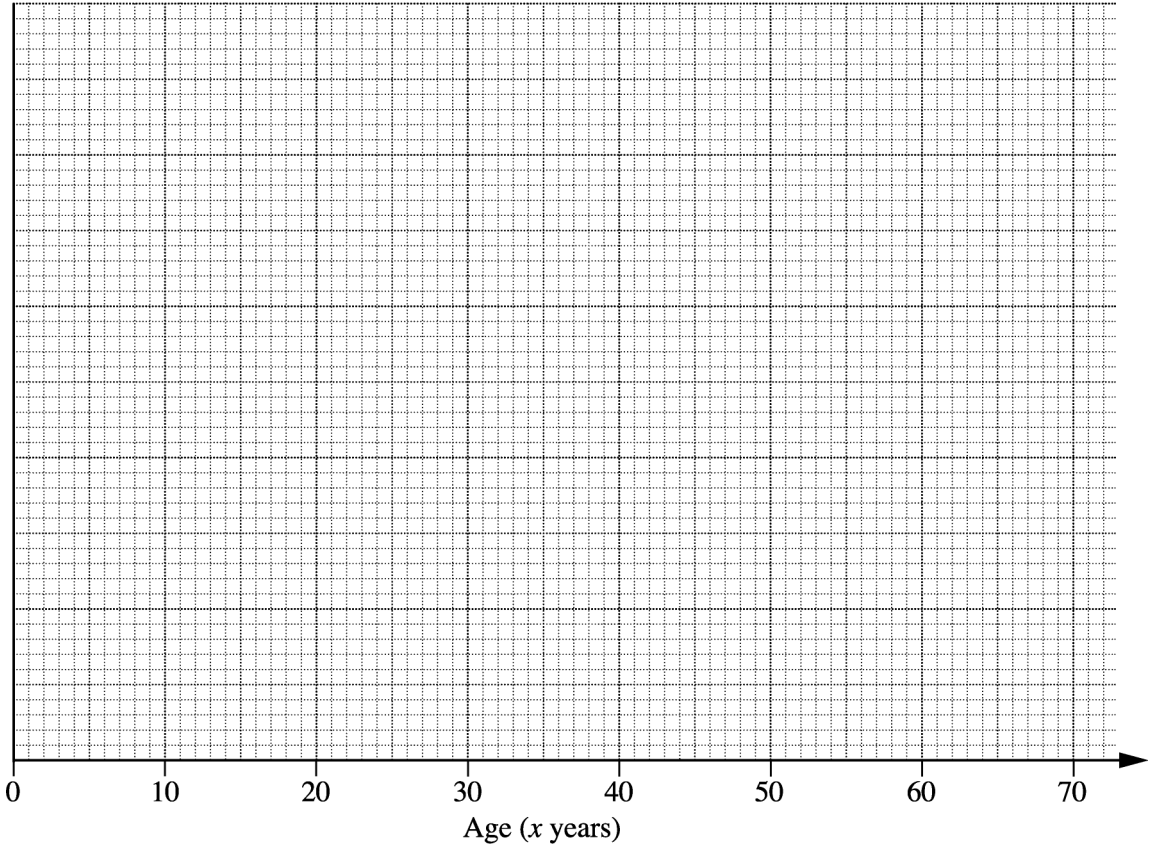
5	
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- 19 The table shows the distribution of the ages, x years, of 100 passengers on a flight from Heathrow airport.

Age (x years)	Number of passengers
$0 \leq x < 20$	14
$20 \leq x < 40$	24
$40 \leq x < 50$	36
$50 \leq x < 60$	21
$60 \leq x < 70$	5
$70 \leq x$	0

Draw a histogram to illustrate these data.

Mark and label the scale on the vertical axis.



[4]

4	

20 Simplify $\frac{3x^2-5x-2}{3x^2-12}$.

[4]

4

- 21** A driving test examiner knows from experience that, if learners have lessons with a driving school, the probability they will pass the test is 0.6. Otherwise the probability they will pass the test is 0.1.

80% of those she examines have had lessons with a driving school.

- (a)** Show clearly that the probability a learner driver, chosen at random, will pass the test is 0.5.

[2]

- (b)** The examiner tests three learner drivers.

Calculate the probability that exactly one of these passes the test.

(b) _____ [2]

4

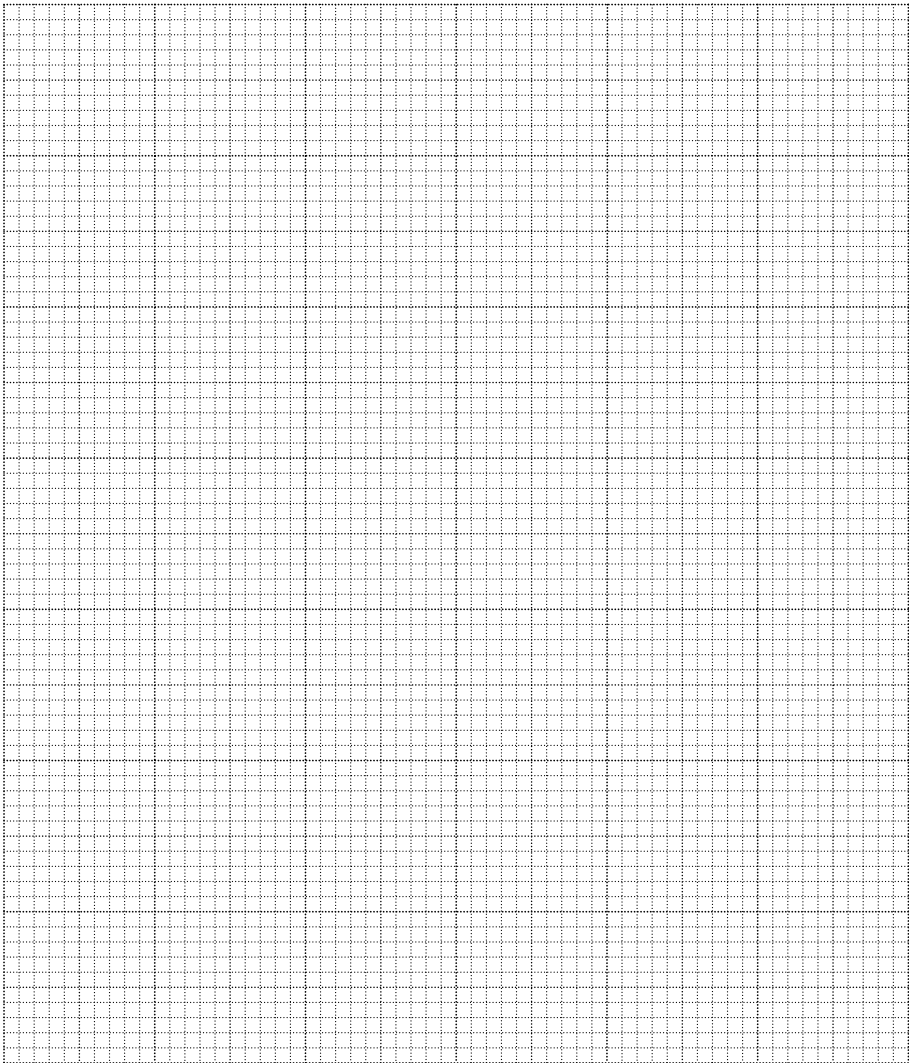
22 In an experiment, it is thought that x and y are connected by a formula of the type

$$y=\frac{a}{x^2}+b.$$

Some values of x and y are given in the following table.

x	1	2	3
y	21	$7\frac{1}{2}$	5

By drawing a suitable graph, find the values of a and b .



[2]

$a =$ _____ [1]

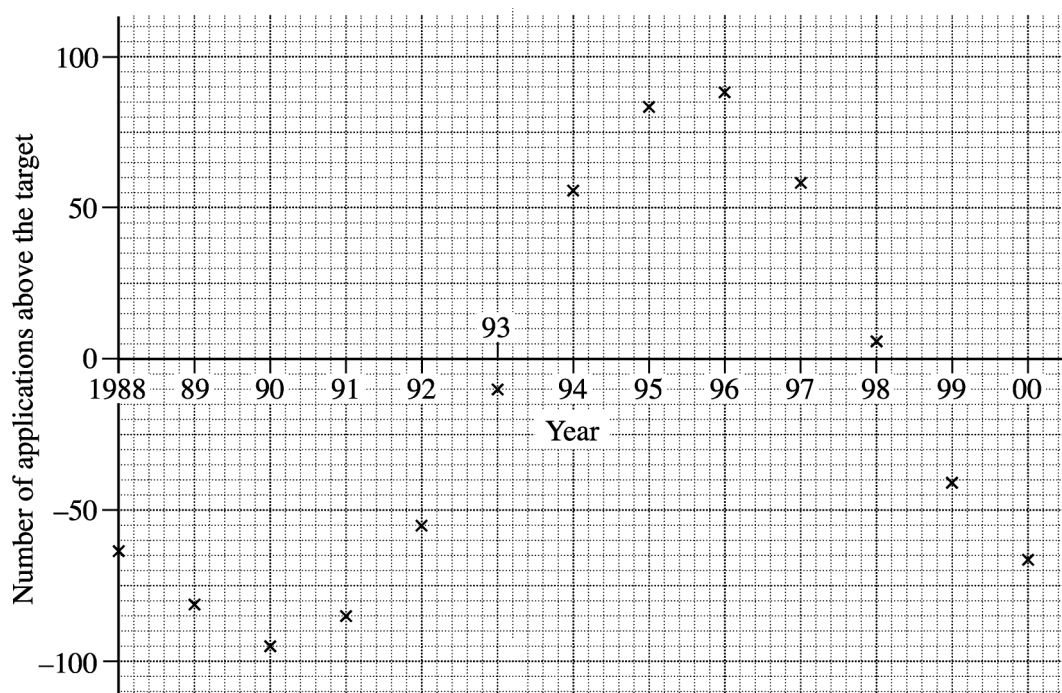
$b =$ _____ [1]

4

23 An American medical college keeps a record of the number of applications it receives each year.

It has a target of 350 applications per year.

This diagram shows the number of applications above or below the target.



(a) Use the diagram to complete these statements.

The **next** year that applications will begin increasing will be _____ [1]

The **next** year that applications will be greater than the target will be _____ [1]

The expected number of applications in the year 2001 is _____ [1]

(b) The data can be modelled as

$$n = -p \cos(qt)$$

where n = the number of applications,
 t = the time in years, with 1990 as year 0,
 and p and q are constants.

Find approximate values for p and q .

(b) $p =$ _____ [1]

$q =$ _____ [1]

5