OXFORD CAMBRIDGE AND RSA EXAMINATIONS
General Certificate of Secondary Education

MATHEMATICS C   **1966/2343B**
(Graduated Assessment)

HIGHER TERMINAL PAPER – SECTION B

| Tuesday | **7 JUNE 2005** | Afternoon | 1 hour |

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

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.
*   Write your answers, in blue or black ink, on the dotted lines unless the question says otherwise.
*   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.

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 50.
*   Section B starts with question 12.
*   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 11 printed pages and 1 blank page.

Formulae Sheet: Higher Tier

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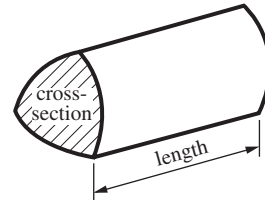
In any triangle ABC

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

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

Area of triangle = $\frac{1}{2} ab \sin C$
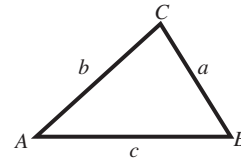
Volume of sphere = $\frac{4}{3} \pi r^3$

Surface area of sphere = $4\pi r^2$
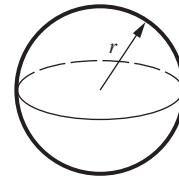
Volume of cone = $\frac{1}{3} \pi r^2 h$

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

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

12 **(a)** Calculate.

$$\frac{26\cdot 1}{\sqrt{(15\cdot 6 - 3\cdot 78)}}$$

Give your answer correct to 3 significant figures.

(a) ....[2]

(b) Calculate.

$$4\cdot 86 \times 10^{-6} - 4\cdot 5 \times 10^{-7}$$

Give your answer in standard form.

(b) ....[2]

4

13 The table below shows the percentage of Year 9 pupils reaching level 6 in English at Oakmount School.
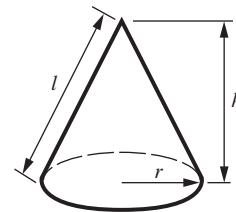
	1999	2000	2001	2002	2003	2004
Percentage of pupils	34	52	37	46	53	36

(a) Calculate the three-year moving averages.

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

(b) Use the three-year moving averages to describe the trend.

....

....[1]

3

[Turn over

14
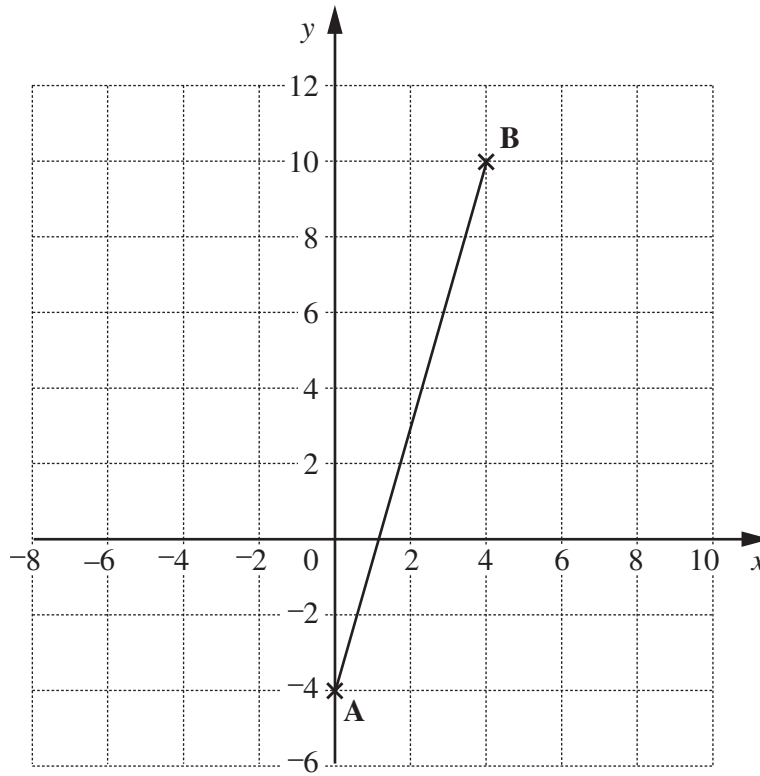
A is the point (0, −4) and B is the point (4, 10).

(a) **Calculate** the length of AB.
Show your working clearly.

(a) ....[3]

(b) Find

    (i) the gradient of the line through A and B,

(b)(i) ....[2]

    (ii) the equation of the line through A and B.

(ii) ....[2]

7

15

M

Not to scale

17·5°

A   B
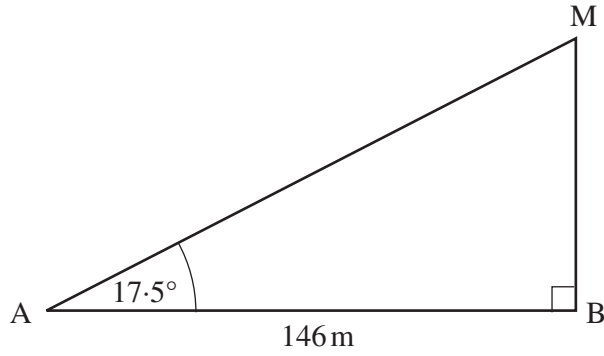
146 m

The diagram shows two points, A and B, on horizontal ground
and a vertical mast BM.

AB = 146 m and angle MAB = 17·5°.

Calculate the height of the mast.
Give your answer to a sensible degree of accuracy.

....m [4]

4	

[Turn over

16 The population of a village is changing.
Planners use a formula to predict its population.
The formula is

$$P = 870 \times 0.98^t$$

where P is the population and
t is the number of years after January 1st 2005.

(a) What was the population on January 1st 2005?

(a) ....[1]

(b) Calculate the predicted population on January 1st 2008.

(b) ....[2]

(c) Describe how the population is predicted to change.

....

....[2]

5

17 P, Q and R are points on the circumference of a circle.
PQ = QR and angle PQR = 48°.
The tangent ST touches the circle at R.
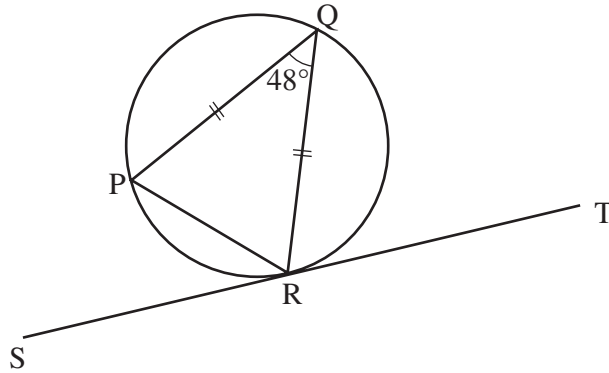
Not to scale

(a) Calculate the size of angle QRT, giving reasons for your answer.

...............° because ....

....

....[3]

(b) PQ = 4 cm.

Calculate the area of triangle PQR.

(b) ....cm² [2]

5

[Turn over

18 (a) Anne drives 15 miles at a steady speed of 20 mph and then 30 miles at a steady speed of 60 mph.

Work out the **total** time for her journey.

(a) ....[3]

(b) (i) Jamie cycles 12 miles at a steady speed of x mph and then 25 miles at a steady speed of $(x + 4)$ mph.

Write down an expression, in terms of x, for the **total** time that Jamie takes.

(b)(i) ....[1]

(ii) The total time that Jamie takes is 2 hours.

Form an equation in x and show that it simplifies to $2x^2 - 29x - 48 = 0$.

....

....

....

....

....

....

....

....[3]

(iii) Solve the equation $2x^2 - 29x - 48 = 0$ to find the speed x mph.

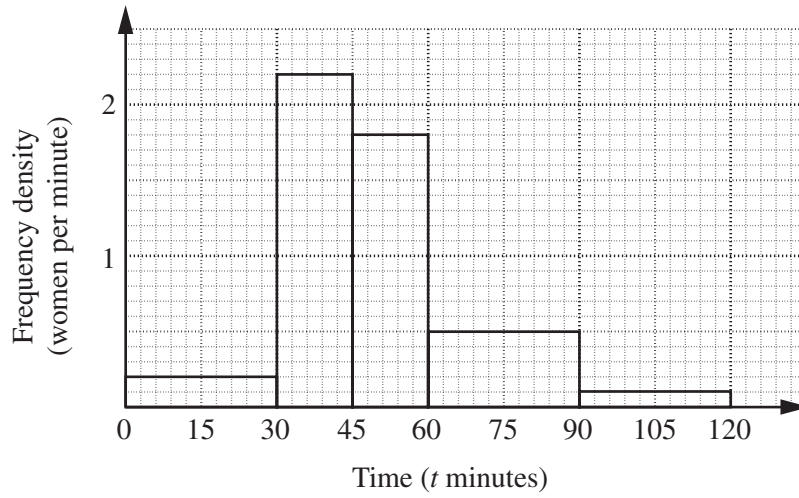**(iii)** ....[3]

10

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19 Solve the equation cos $x = 0{\cdot}75$ for values of x between $0°$ and $360°$.

....[2]

2

[Turn over

20 Eighty-four women completed a charity walk.
The histogram shows the distribution of the times, t minutes, taken by the women.

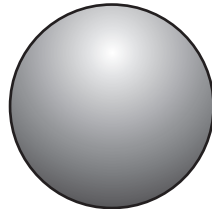Complete the table and use it to calculate an estimate of the mean time taken for the walk.

Time (t minutes)	Number of women
$0 < t \leqslant 30$	6
$30 < t \leqslant 45$	33
$45 < t \leqslant 60$	
$60 < t \leqslant 90$	
$90 < t \leqslant 120$	
	84

..........................minutes [4]

4	

21 A whole cheese is made in the shape of a sphere.
The volume of the sphere is $5000\,\text{cm}^3$.

(a) Show that the radius of the sphere is approximately $10 \cdot 6\,\text{cm}$.

....

....

....

....

....[2]

(b) The cheese is sliced through the centre to make 20 identical pieces.

Calculate the **total** surface area of one of the pieces.

(b) ....cm^2 [4]

6

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