OXFORD CAMBRIDGE AND RSA EXAMINATIONS

General Certificate of Secondary Education

MATHEMATICS C
(Graduated Assessment)

1966/2343B

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.

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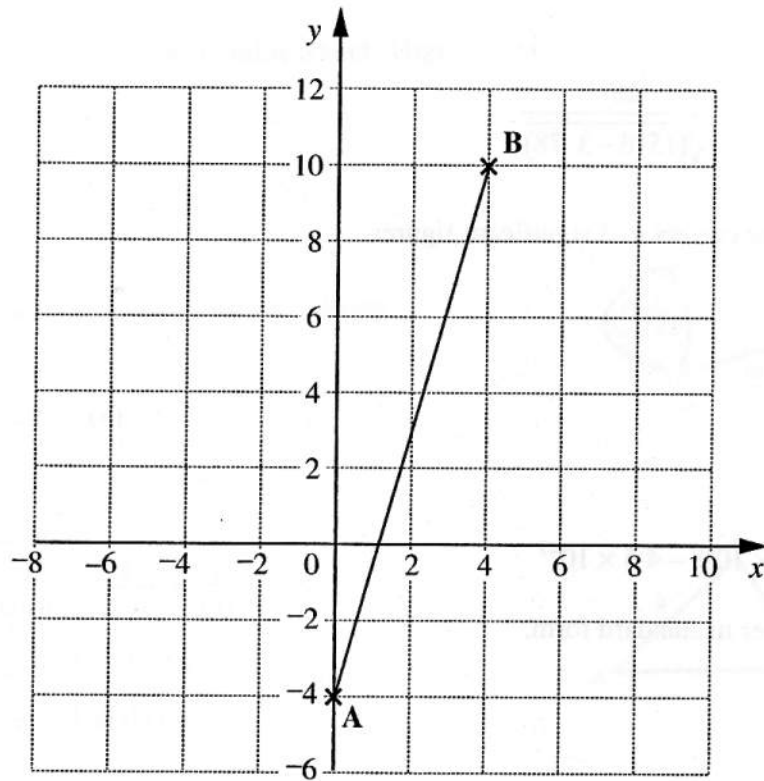
A is the point (0, ⁻4) and B is the point (4, 10).

(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]
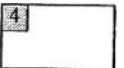
15

Not to scale

17·5°

A

146 m

B

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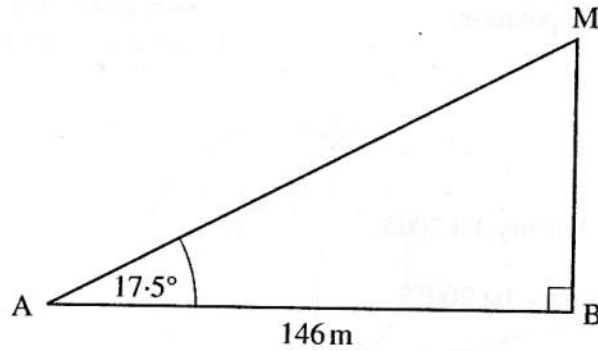
The diagram shows two points, A and B, on horizontal ground and a vertical mast BM.

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.
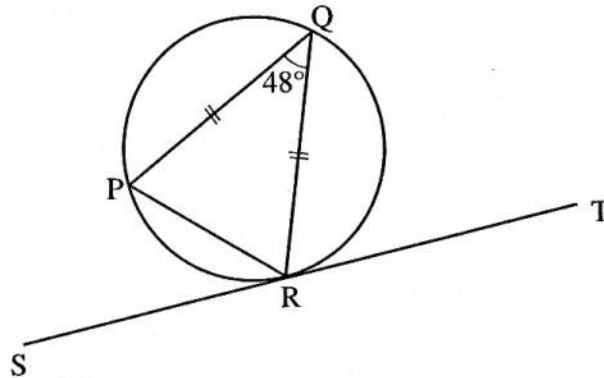
Not to scale

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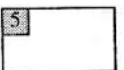
18 (a) Anne drives 15 miles at a steady speed of 20 mph and then 30 miles at a steady speed of 60 mph.

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

19 Solve the equation $\cos x = 0{\cdot}75$ for values of x between $0°$ and $360°$.
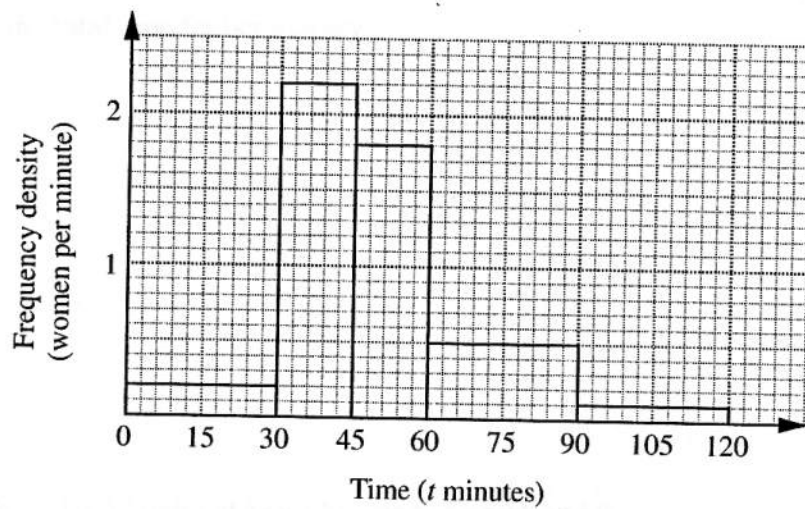
................................[2]

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.

Time (t minutes)
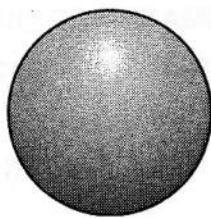
Complete the table and use it to calculate an estimate of the mean time taken for the walk.

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 cm³.

(a) Show that the radius of the sphere is approximately 10·6 cm.

....

....

....

....

....[2]

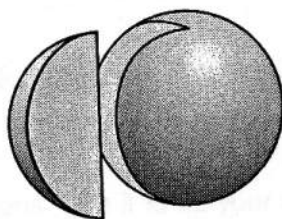..

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

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

(b) ....cm² [4]

6