OCR
RECOGNISING ACHIEVEMENT

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
General Certificate of Secondary Education

MATHEMATICS SYLLABUS A 1962/4

PAPER 4 (Intermediate Tier)

Friday **13 JANUARY 2006** Morning 2 hours

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

Candidate Name	Centre Number	Candidate Number

TIME 2 hours

INSTRUCTIONS TO CANDIDATES

- Write your name in the space above.
- Write your 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.
- Show your working. Marks may be given for working that shows that you know how to solve the problem even if you get the answer wrong.
- You are expected to use an electronic calculator for this paper.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [ ] at the end of each question or part question.
- Unless otherwise instructed in the question, take π to be 3.142 or use the π button on your calculator.

FOR EXAMINER'S USE

This question paper consists of 17 printed pages and 3 blank pages.

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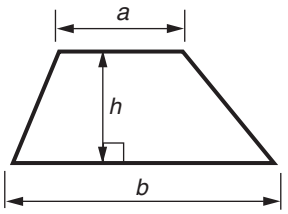
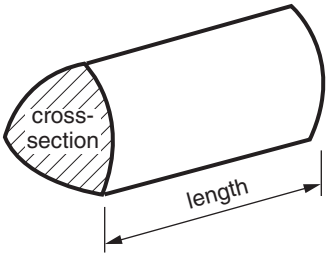
Formulae Sheet: Intermediate Tier

Area of trapezium = $\frac{1}{2}(a + b)h$



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



1 (a)

21 22 23 24 25 26 27 28 29

From the list above, choose

(i) a prime number,

.....

(a)(i) _____[1]

(ii) a cube number.

.....

(ii) _____[1]

(b) Work out the value of

$$(13 + v)\ t$$

when $v = -6$ and $t = 3$.

.....

.....

.....

(b) _____[2]

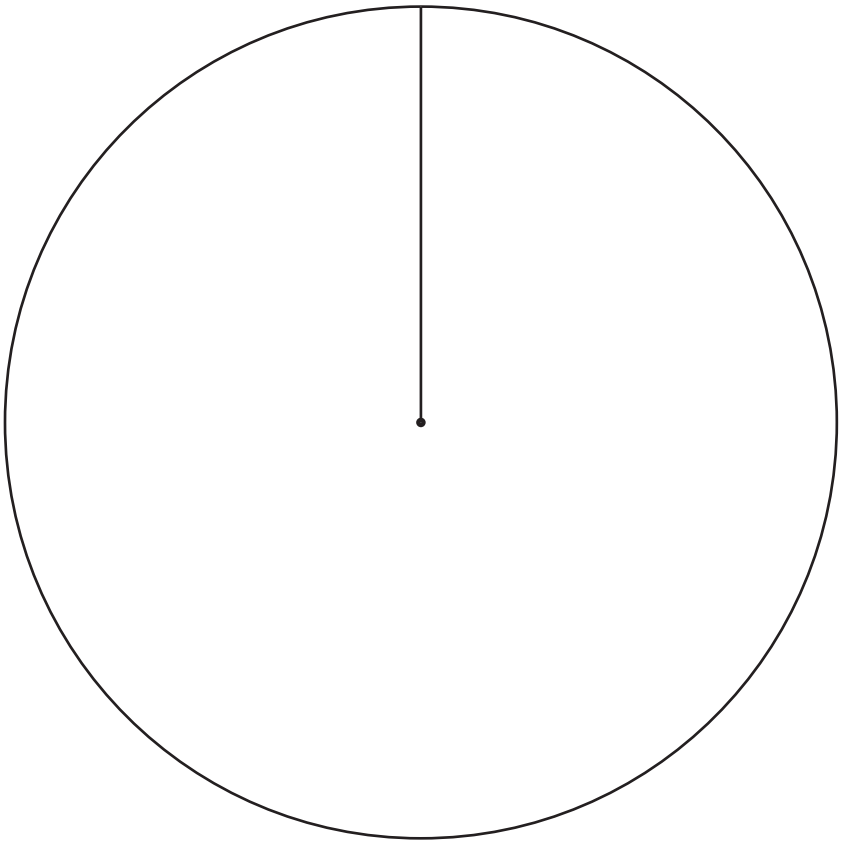
(c) Use your calculator to find the value of $\frac{243}{(0.3)^2}$.

(c) _____[2]

2 In a survey, 120 library users were asked, "How long have you spent in the library this week?". The results are shown in the table.

Time spent	Number of users
Less than 1 hour	60
Between 1 and 2 hours	27
Between 2 and 3 hours	14
More than 3 hours	19

(a) Using the circle below, draw and label a pie chart to show this information.



[4]

(b) What percentage of the 120 library users spent more than 3 hours in the library?

.....

.....

(b) _____ % [2]

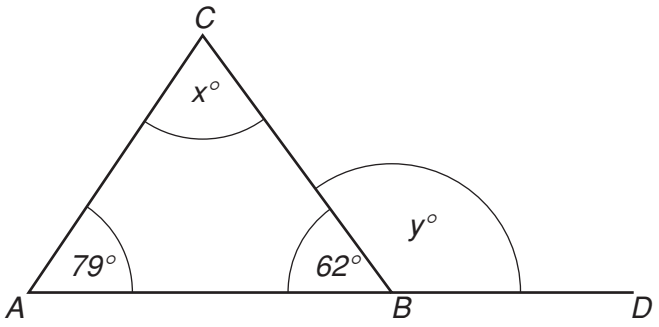
3 **(a)** A triangular garden has sides 40 m, 30 m and 25 m.

Complete the scale drawing of the garden. The 40 m side has been drawn for you.
Use a scale of 1 cm to represent 5 m.

40 m

[3]

(b)



NOT TO SCALE

In the diagram *ABD* is a straight line.

(i) Work out the value of *x*. Give a reason for your answer.

.....

.....

x = _____ because _____

_____[2]

(ii) Work out the value of *y*. Give a reason for your answer.

.....

.....

y = _____ because _____

_____[2]

4 **(a)** Simplify.

$$7x + 2y - 5x - 5y$$

.....

.....

(a) _____[2]

(b) Solve.

$$4x - 3 = 17$$

.....

.....

(b) _____[2]

---

5 Jack buys some coffee in a French shop.

(a) In France the coffee costs €1.89 per pack.
This coffee can be bought in Britain for £2.25 for the same size pack.
The exchange rate is £1 = €1.35.

How much does Jack save by buying the pack of coffee in France?
Give your answer in pence.

.....

.....

.....

.....

(a) _____ p [4]

(b) Jack uses two thirds of a pack of coffee each week.

Find the least number of packs of coffee that Jack must buy to have enough coffee to last 10 weeks.

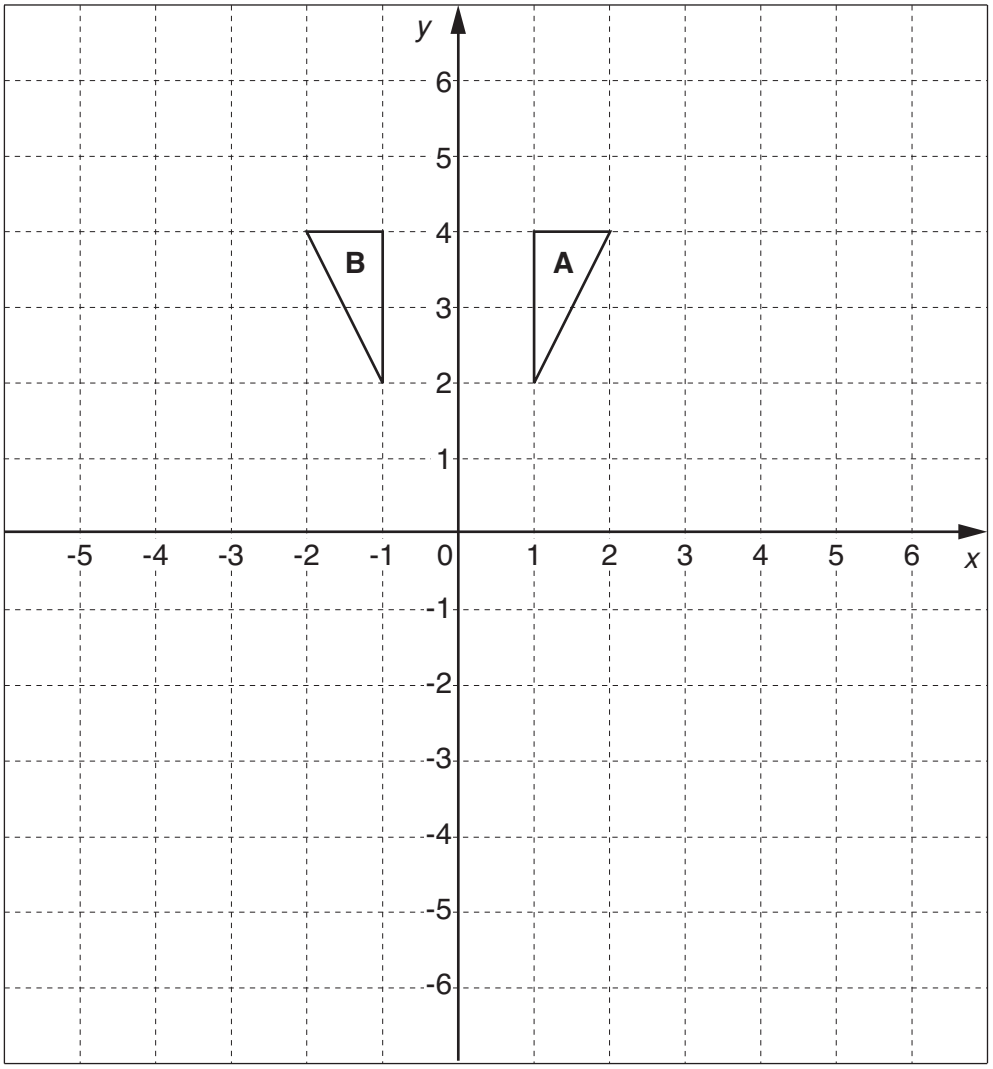
.....

.....

.....

(b) _____[3]

6



(a) Describe the single transformation which maps triangle **A** onto triangle **B**.

_____

_____ [2]

(b) Translate triangle **A** 5 units to the left and 6 units down.
Label the image **C**. [1]

(c) Reflect triangle **A** in the line $y = 1$.
Label the image **D**. [1]

(d) Rotate triangle **A** a quarter turn anticlockwise about the origin.
Label the image **E**. [3]

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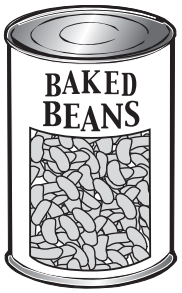
7 **(a)**



A large can of beans costs x pence.
A small can costs 6 pence less than a large can.

(i) Write down, in terms of x, the cost of a small can of beans.

(a)(i) _____ p [1]

(ii) Four large cans and one small can of beans cost a total of 89 pence.

Write down an equation in x and solve it.

.....

.....

.....[3]

(b) Multiply out.

$$6\,(x - 5)$$

.....

(b) _____[1]

(c) Factorise.

(i) $7a + 14$

.....

(c)(i) _____[1]

(ii) $x^2 - 4x$

.....

(ii) _____[1]

8 Use your calculator to work these out.

(a) $\frac{4.46}{8.21 + 3.75}$ Give your answer correct to one decimal place.

.....

(a) _____[2]

(b) $\sqrt{9.75^2 + 6 \times 8.32}$ Give your answer correct to two significant figures.

.....

(b) _____[2]

(c) $(8 \times 10^3) \times (6.4 \times 10^5)$ Give your answer in standard form.

.....

(c) _____[2]

(d) 72 out of 125 as a percentage.

.....

.....

(d) _____ % [2]

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9 Rearrange

$$y = 7x - 5$$

to make x the subject of the formula.

.....

.....

.....

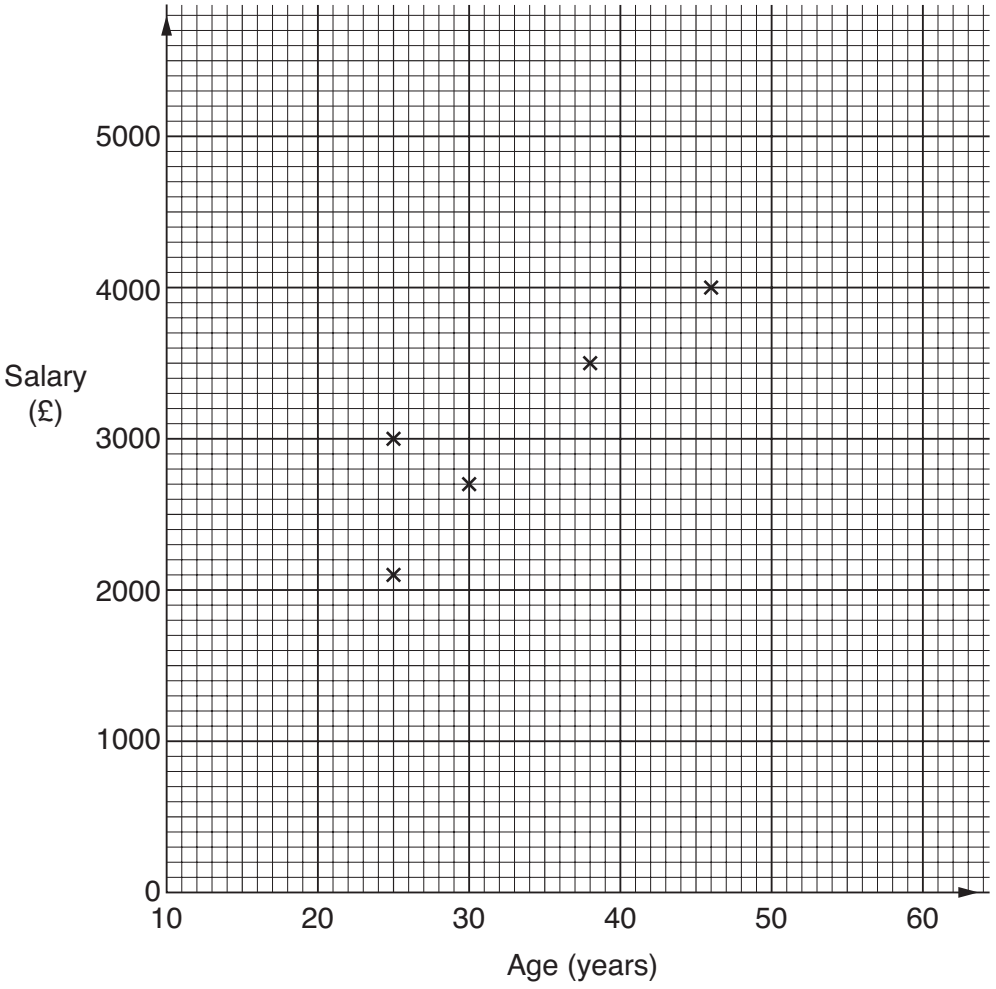
_____[2]

[Turn over

10 (a) The table below shows the ages and monthly salaries of 11 employees in a company department.

Age (years)	25	30	46	25	38	20	23	38	45	50	49
Salary (£)	2100	2700	4000	3000	3500	1400	2100	2500	2900	3600	3200

(i) On the axes below draw a scatter graph to illustrate this information. The first five points have been plotted for you.



[2]

(ii) Comment briefly on the relationship between salary and age for these employees.

_____

_____[1]

(iii) Explain why it may not be reasonable to use this information to estimate the salary of an employee aged 58.

_____

_____

_____[1]

(b) The grouped frequency table below summarises the monthly salaries of all 120 employees in the company.

Monthly Salary (£m)	Frequency	Mid-interval value
$1000 < m \leqslant 2000$	24	
$2000 < m \leqslant 3000$	57	
$3000 < m \leqslant 4000$	35	
$4000 < m \leqslant 5000$	3	
$5000 < m \leqslant 6000$	1	

Calculate an estimate of the mean monthly salary of the employees.
Take the mid-interval values as £1500, £2500, ...

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.....

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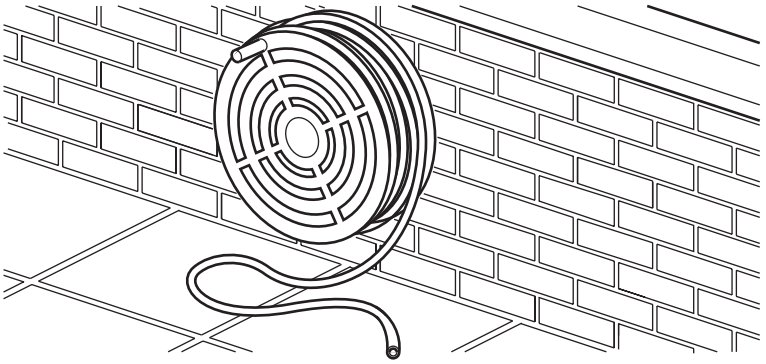
.....

.....

(b) £ _____[3]

11



A cylindrical hosepipe has internal radius 0.7 centimetres and length 15 metres.
It is full of water.

Find the volume of water in the hosepipe. Give your answer in cubic centimetres.

.....

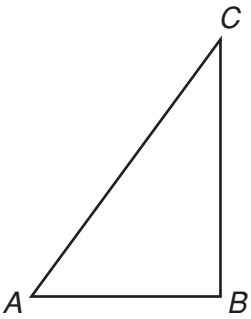
.....

.....

.....

_____ cm^3 [4]

12



NOT TO SCALE

In triangle *ABC*, *AB* = 5.6 cm, *BC* = 10.5 cm and *AC* = 11.9 cm.

Use Pythagoras' theorem to show that triangle *ABC* is a right-angled triangle.

_____

_____

_____

_____

_____

_____[3]

13 **(a)** Complete the table below for $y = 2x^2 + 4x - 3$.

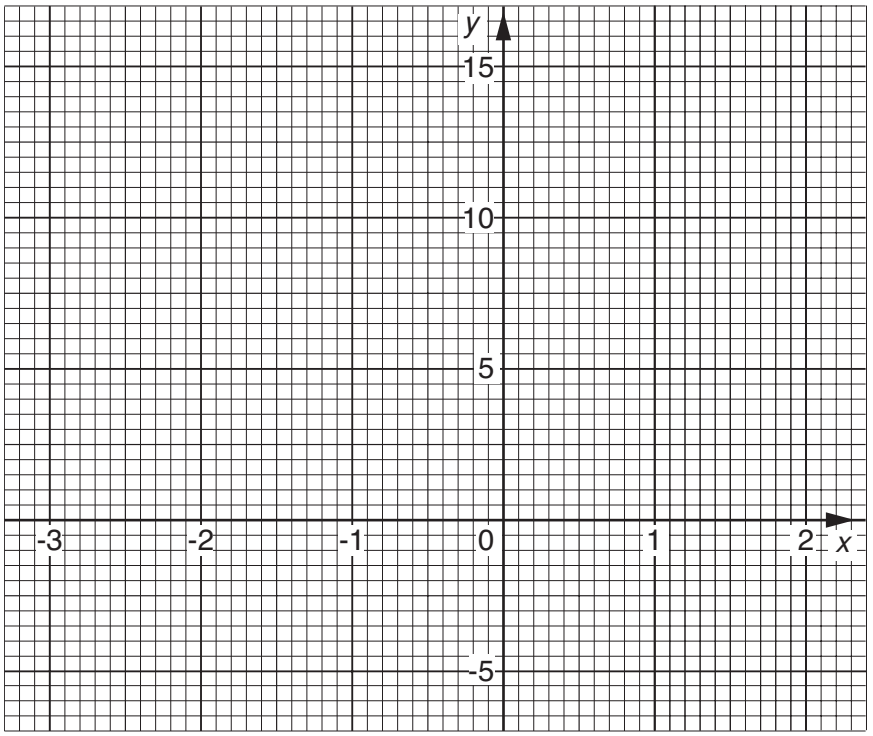
.....

.....

x	–3	–2	–1	0	1	2
y	3		–5	–3		13

[2]

(b) Draw the graph of $y = 2x^2 + 4x - 3$ on the axes below.



[2]

(c) Use your graph to solve $2x^2 + 4x - 3 = 0$.

(c) _____[2]

14 Ahmed rents a flat. The rent increases by 5% of the previous year's rent each year. He paid £5200 in 2005.

(a) How much rent will Ahmed pay in 2007?

.....

.....

.....

.....

(a) £ _____[3]

(b) In which year will Ahmed's rent first be more than £6500?

.....

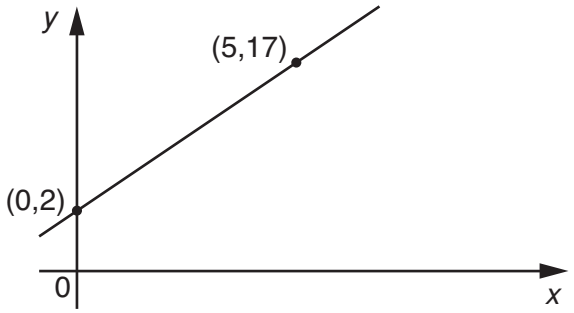
.....

.....

.....

(b) _____[2]

15



NOT TO SCALE

(a) Find the gradient of the straight line through the points (0, 2) and (5, 17).

.....

.....

(a) _____[2]

(b) Write down the equation of this straight line.

(b) _____[1]

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16 Solve algebraically these simultaneous equations.

$$3x + 2y = 20$$
$$2x + 3y = 15$$

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.....

.....

$x =$ _____ $y =$ _____[4]

17

Tom sold his car for £6600. This was 40% less than the price he had paid for the car.

How much did Tom pay for the car originally?

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.....

.....

.....

£ _____[3]

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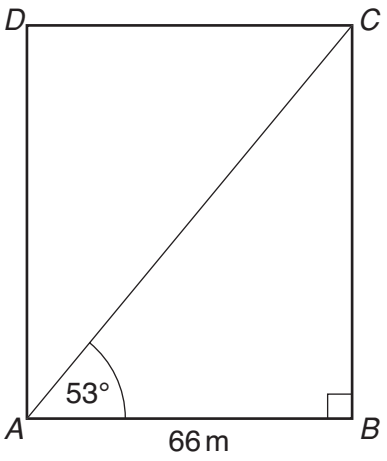
18 (a)



NOT TO SCALE

The length of one side of a rectangular field is 66 m.
The angle between this side and the diagonal is 53°.

Calculate the length *BC*. Give your answer to an appropriate degree of accuracy.

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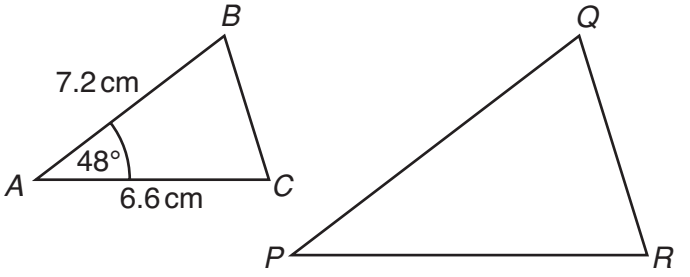
.....

.....

(a) _____ m [4]

(b)



NOT TO SCALE

Triangle *PQR* is an enlargement of triangle *ABC* with scale factor 1.5.

(i) Work out *PQ*.

.....

.....

(b)(i) _____ cm [2]

(ii) What is the size of angle *P*?

.....

(ii) _____ ° [1]

19 A café keeps quarterly records of ice-cream sales.
The table below shows the sales, in thousands of pounds, for 2004 and 2005.

Year	2004				2005			
Quarter	1	2	3	4	1	2	3	4
Sales (thousands of £s)	2	13	18	3	5	16	20	6

(a) On the grid below plot the four-quarter moving averages.
The first two have been plotted for you.

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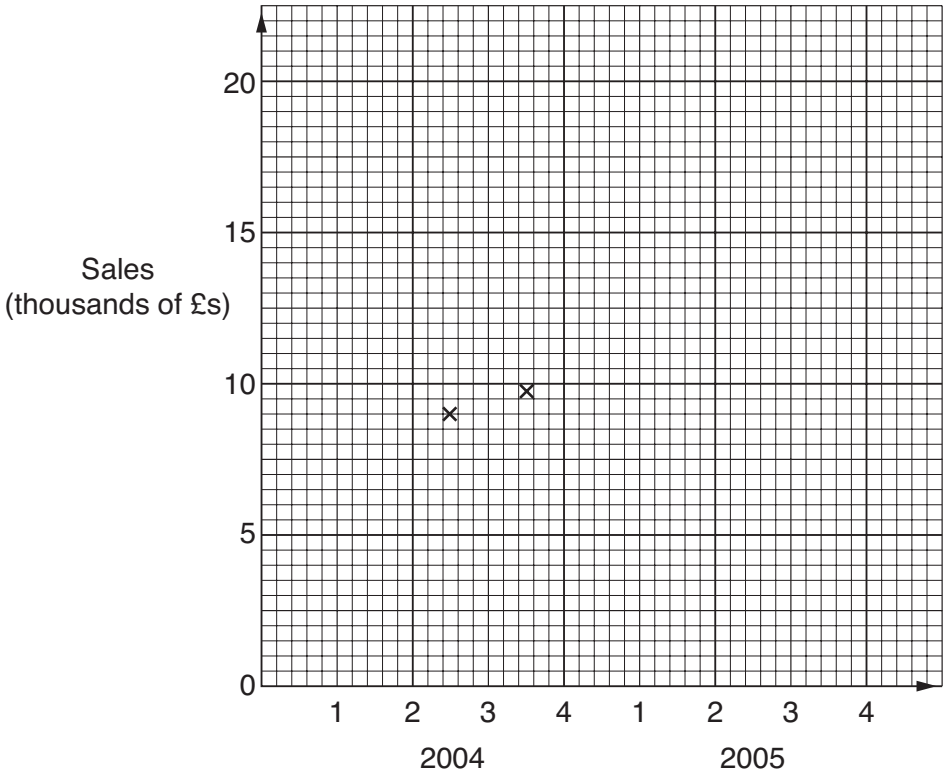

[3]

(b) Use the diagram to comment on the general trend in ice-cream sales.

_____

_____

_____[1]

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