

Centre No.					
Candidate No.					

Paper Reference					
5	5	0	5	/	05

Surname	Initial(s)
Signature	

Paper Reference(s)

**5505/05**

# Edexcel GCSE

## Mathematics A – 1387

Paper 5 (Non-Calculator)

Higher Tier

Wednesday 4 June 2003 – Afternoon

Time: 2 hours

Examiner's use only

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Team Leader's use only

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### Materials required for examination

Ruler graduated in centimetres and millimetres, protractor, compasses, pen, HB pencil, eraser.  
Tracing paper may be used.

### Items included with question papers

Formulae sheet

### Instructions to Candidates

In the boxes above, write your centre number, candidate number, your surname, initial(s), and your signature.

Check that you have the correct question paper.

Answer **ALL** the questions in the spaces provided in this question paper.

Supplementary answer sheets may be used.

### Information for Candidates

The total mark for this paper is 100.

The marks for the individual questions and parts of questions are shown in round brackets: e.g. (2).

**Calculators must not be used.**

This paper has 24 questions. There are no blank pages.

### Advice to Candidates

Show all stages in any calculations.

Work steadily through the paper.

Do not spend too long on one question.

If you cannot answer a question, leave it and attempt the next one.

Return at the end to those you have left out.

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**Answer ALL TWENTY FOUR questions.**

*Leave  
blank*

**Write your answers in the spaces provided.**

**You must write down all the stages in your working.**

**You must NOT use a calculator.**

1. Using the information that

$$97 \times 123 = 11\,931$$

write down the value of

(i)  $9.7 \times 12.3$

(ii)  $0.97 \times 123\,000$

(iii)  $11.931 \div 9.7$

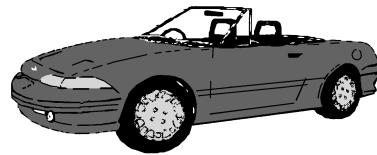
.....  
.....  
.....

**(3)**

2. Ben bought a car for £12 000.

Each year the value of the car depreciated by 10%.

Work out the value of the car two years after he bought it.



£ .....

**(3)**

3. Solve  $7r + 2 = 5(r - 4)$

Leave blank

$r = \dots\dots\dots$

(2)

4. (a)  $-2 < x \leq 1$

$x$  is an integer.

Write down all the possible values of  $x$ .

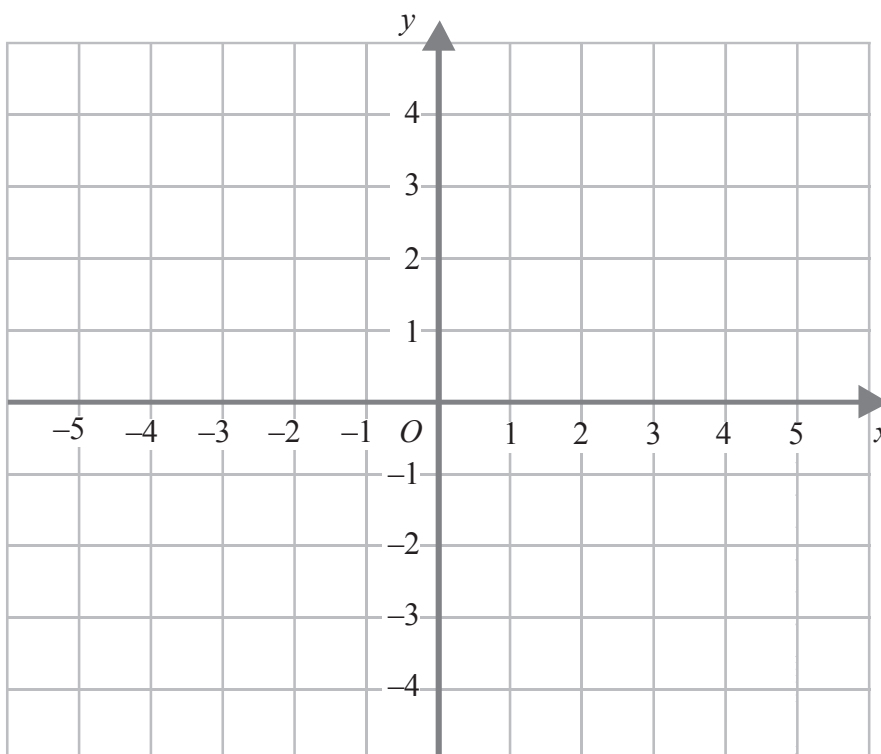
$\dots\dots\dots$

(2)

(b)  $-2 < x \leq 1$        $y > -2$        $y < x + 1$

$x$  and  $y$  are integers.

On the grid, mark with a cross (X), each of the six points which satisfies **all** these 3 inequalities.



(3)

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5. Here are the first 5 terms of an arithmetic sequence.

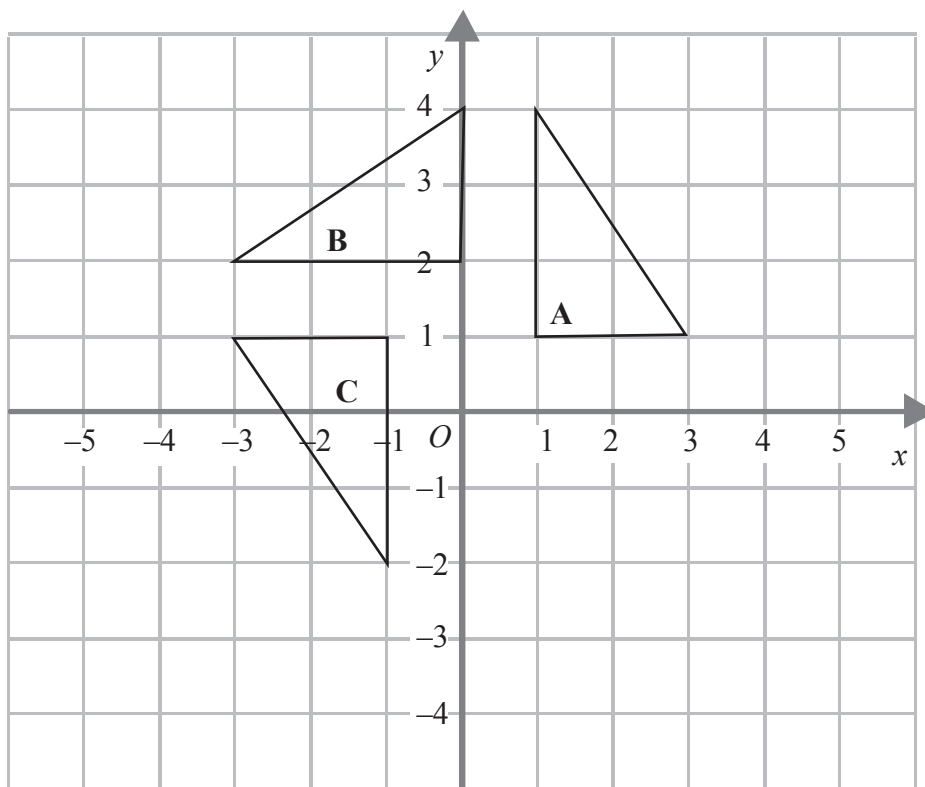
6, 11, 16, 21, 26

Find an expression, in terms of  $n$ , for the  $n$ th term of the sequence.

.....

(2)

6.



Shape **A** is rotated  $90^\circ$  anticlockwise, centre  $(0,1)$ , to shape **B**.

Shape **B** is rotated  $90^\circ$  anticlockwise, centre  $(0,1)$ , to shape **C**.

Shape **C** is rotated  $90^\circ$  anticlockwise, centre  $(0,1)$ , to shape **D**.

(a) Mark the position of Shape **D**.

(2)

(b) Describe the single transformation that takes shape **C** to shape **A**.

.....

(2)

Leave  
blank

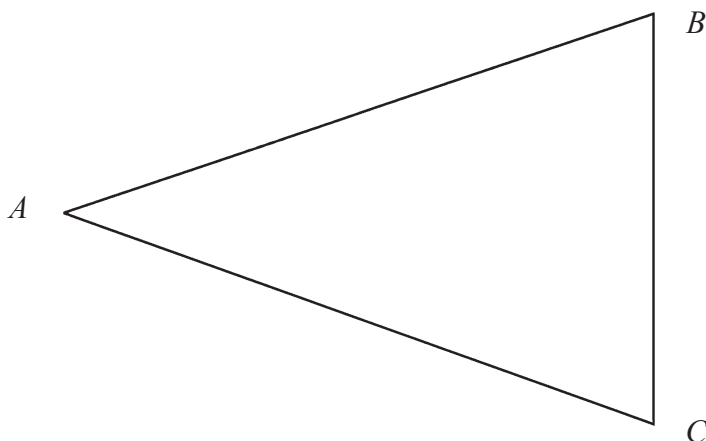
7. The diagram represents a triangular garden  $ABC$ .

The scale of the diagram is 1 cm represents 1 m.

A tree is to be planted in the garden so that it is

nearer to  $AB$  than to  $AC$ ,  
within 5 m of point  $A$ .

On the diagram, shade the region where the tree may be planted.



(3)

8. This table shows some expressions.

The letters  $x$ ,  $y$  and  $z$  represent lengths.

Place a tick in the appropriate column for each expression to show whether the expression can be used to represent a length, an area, a volume or none of these.

Expression	Length	Area	Volume	None of these
$x + y + z$				
$xyz$				
$xy + yz + xz$				

(3)

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Turn over

9. Mr Beeton is going to open a restaurant.  
He wants to know what type of restaurant people like.  
He designs a questionnaire.

*Leave  
blank*

- (a) Design a suitable question he could use to find out what type of restaurant people like.

(2)

He asks his family “Do you agree that pizza is better than pasta?”

This is **not** a good way to find out what people who might use his restaurant like to eat.

- (b) Write down **two** reasons why this is **not** a good way to find out what people who might use his restaurant like to eat.

First reason .....

.....

Second reason .....

.....

(2)

10. A spaceship travelled for  $6 \times 10^2$  hours at a speed of  $8 \times 10^4$  km/h.

*Leave  
blank*

- (a) Calculate the distance travelled by the spaceship.  
Give your answer in standard form.

..... km  
(3)

One month an aircraft travelled  $2 \times 10^5$  km.  
The next month the aircraft travelled  $3 \times 10^4$  km.

- (b) Calculate the total distance travelled by the aircraft in the two months.  
Give your answer as an ordinary number.

..... km  
(2)

11. (a) Expand and simplify

$$(x + y)^2$$

.....  
(2)

- (b) Hence or otherwise find the value of

$$3.47^2 + 2 \times 3.47 \times 1.53 + 1.53^2$$

.....  
(2)

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12.

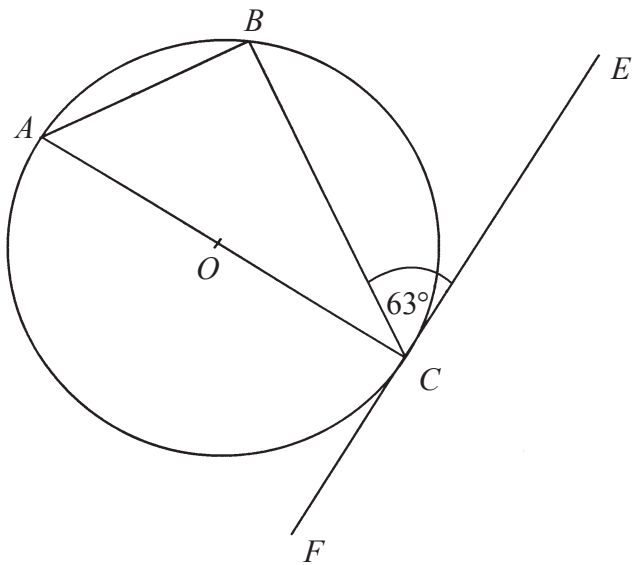


Diagram **NOT** accurately drawn

*Leave blank*

In the diagram,  $A$ ,  $B$  and  $C$  are points on the circle, centre  $O$ .  
Angle  $BCE = 63^\circ$ .  
 $FE$  is a tangent to the circle at point  $C$ .

- (i) Calculate the size of angle  $ACB$ .  
Give reasons for your answer.

- (ii) Calculate the size of angle  $BAC$ .  
Give reasons for your answer.

.....  
○

.....  
○

**(4)**



13. Simplify fully

Leave blank

(i)  $(p^3)^3$

.....

(ii)  $\frac{3q^4 \times 2q^5}{q^3}$

.....

(3)

14. Mary recorded the heights, in centimetres, of the girls in her class.

She put the heights in order.

132    144    150    152    160    162    162    167  
167    170    172    177    181    182    182

(a) Find

(i) the lower quartile,

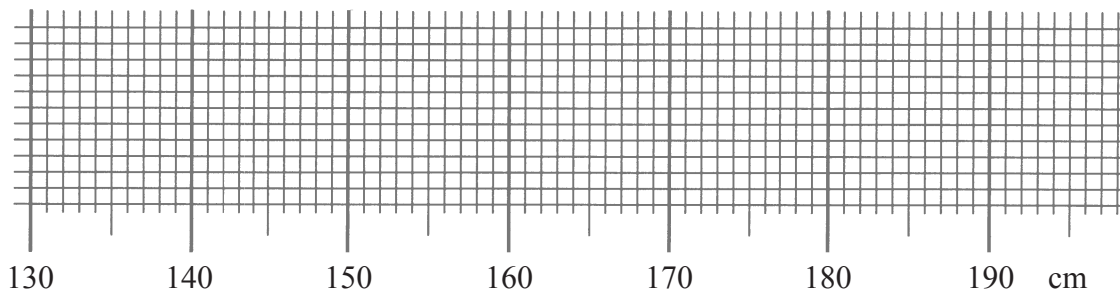
..... cm

(ii) the upper quartile.

..... cm

(2)

(b) On the grid, draw a box plot for this data.



(3)

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15.

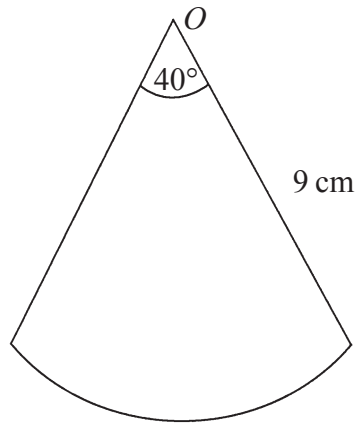


Diagram **NOT** accurately drawn

*Leave blank*

The diagram shows a sector of a circle, centre  $O$ .  
The radius of the circle is  $9\text{ cm}$ .  
The angle at the centre of the circle is  $40^\circ$ .

Find the perimeter of the sector.  
Leave your answer in terms of  $\pi$ .

..... cm  
(4)

16. Work out

(i)  $4^0$

(ii)  $4^{-2}$

(iii)  $16^{\frac{3}{2}}$

.....  
.....  
.....

(3)

17. The force,  $F$ , between two magnets is inversely proportional to the square of the distance,  $x$ , between them.

*Leave blank*

When  $x = 3$ ,  $F = 4$ .

(a) Find an expression for  $F$  in terms of  $x$ .

$F = \dots\dots\dots$   
(3)

(b) Calculate  $F$  when  $x = 2$ .

$\dots\dots\dots$   
(1)

(c) Calculate  $x$  when  $F = 64$ .

$\dots\dots\dots$   
(2)

18. Work out

$$\frac{(5 + \sqrt{3})(5 - \sqrt{3})}{\sqrt{22}}$$

Give your answer in its simplest form.

$\dots\dots\dots$   
(3)

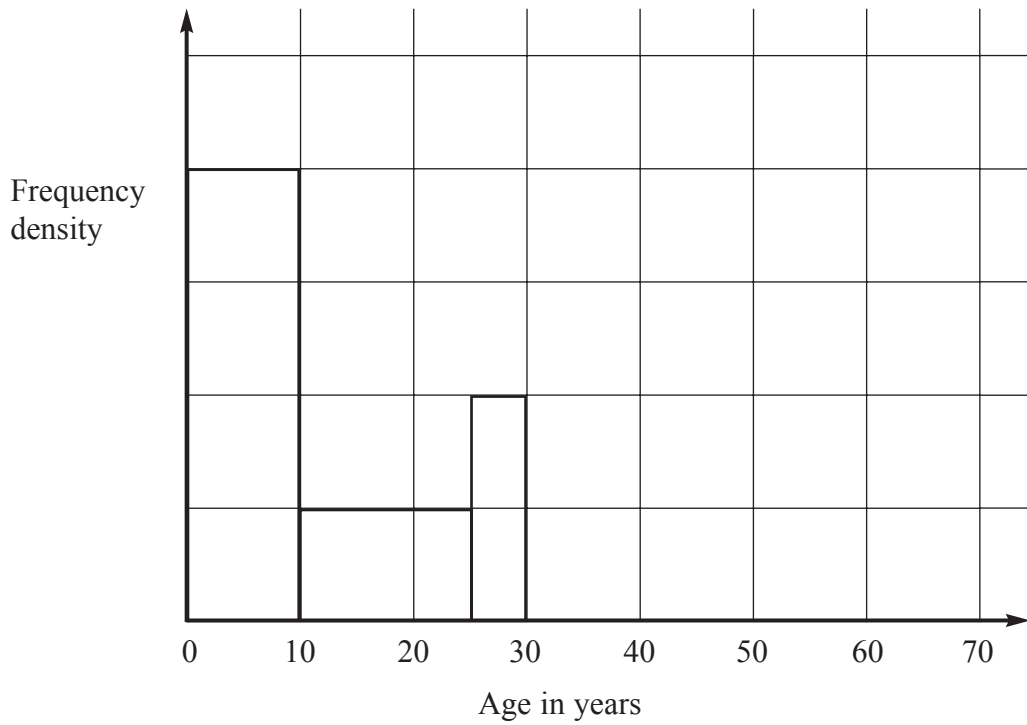
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19. The incomplete table and histogram give some information about the ages of the people who live in a village.

*Leave blank*



(a) Use the information in the histogram to complete the frequency table below.

Age ( $x$ ) in years	Frequency
$0 < x \leq 10$	160
$10 < x \leq 25$	
$25 < x \leq 30$	
$30 < x \leq 40$	100
$40 < x \leq 70$	120

(2)

(b) Complete the histogram.

(2)

Leave  
blank

20. Simplify fully

(a)  $2(3x + 4) - 3(4x - 5)$

.....  
(2)

(b)  $(2xy^3)^5$

.....  
(2)

(c)  $\frac{n^2 - 1}{n + 1} \times \frac{2}{n - 2}$

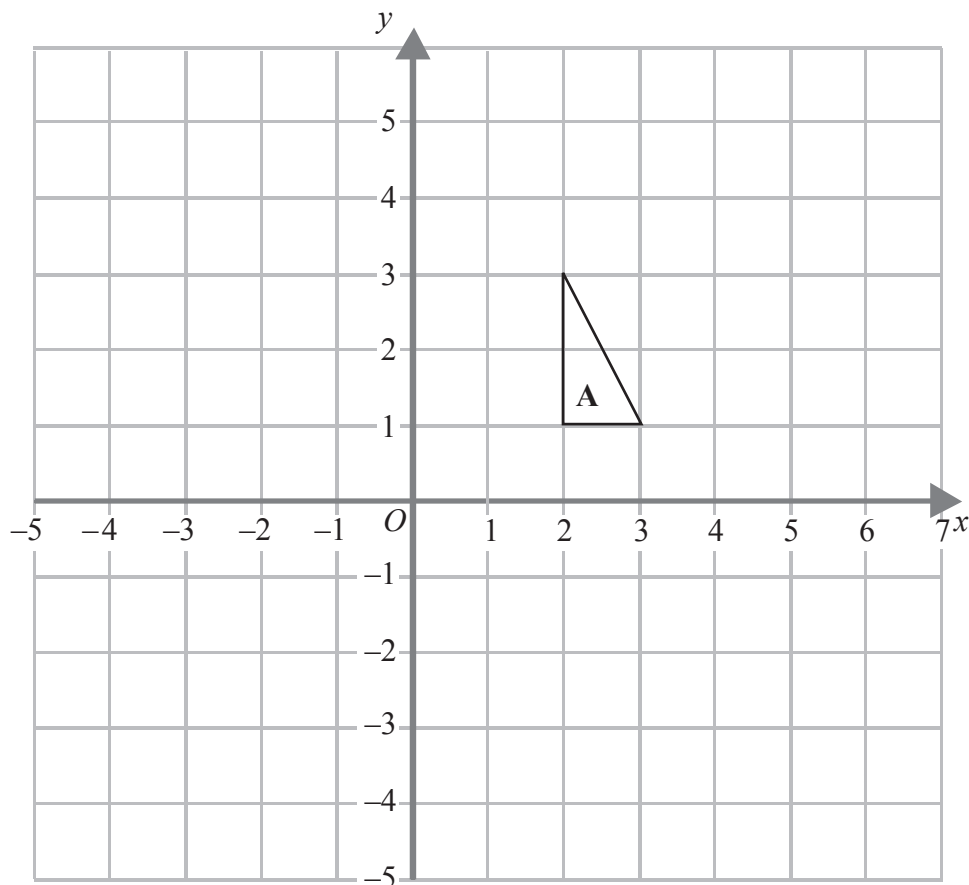
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(3)

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21.



Leave blank

Enlarge triangle **A** by scale factor  $-1\frac{1}{2}$ , centre  $O$ .

(3)

22. A bag contains 3 black beads, 5 red beads and 2 green beads. Gianna takes a bead at random from the bag, records its colour and replaces it. She does this two more times.

Work out the probability that, of the three beads Gianna takes, exactly two are the same colour.

.....  
(5)

23.

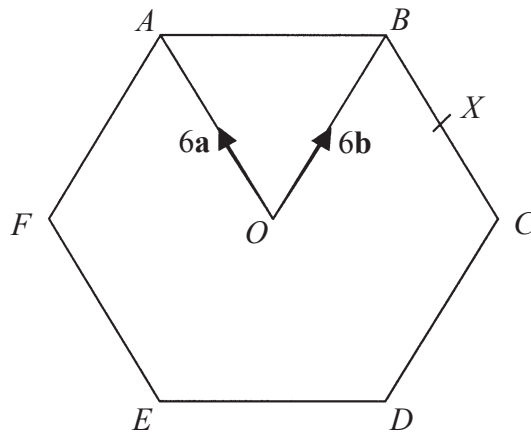


Diagram **NOT** accurately drawn

Leave blank

The diagram shows a regular hexagon  $ABCDEF$  with centre  $O$ .

$$\vec{OA} = 6\mathbf{a} \quad \vec{OB} = 6\mathbf{b}$$

(a) Express in terms of  $\mathbf{a}$  and/or  $\mathbf{b}$

(i)  $\vec{AB}$ ,

.....

(ii)  $\vec{EF}$ .

.....

(2)

$X$  is the midpoint of  $BC$ .

(b) Express  $\vec{EX}$  in terms of  $\mathbf{a}$  and/or  $\mathbf{b}$

.....

(2)

$Y$  is the point on  $AB$  extended, such that  $AB:BY = 3:2$

(c) Prove that  $E$ ,  $X$  and  $Y$  lie on the same straight line.

(3)

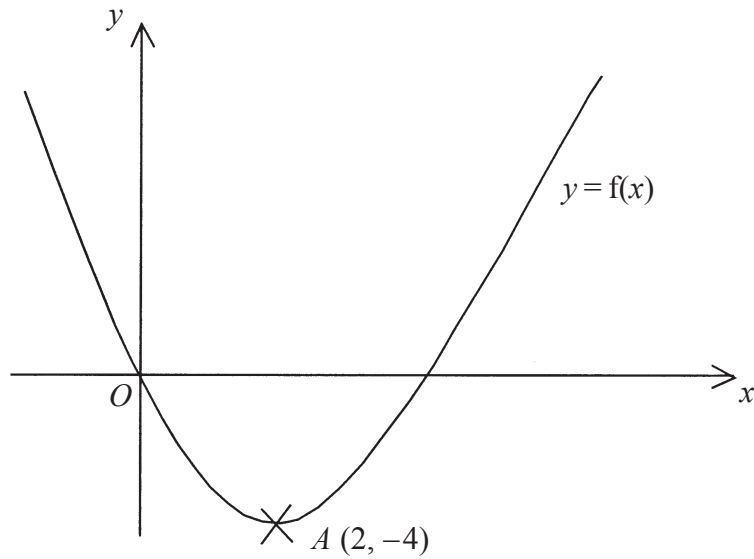
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24. This is a sketch of the curve with equation  $y = f(x)$ .  
It passes through the origin  $O$ .

Leave  
blank



The only vertex of the curve is at  $A(2, -4)$

- (a) Write down the coordinates of the vertex of the curve with equation

(i)  $y = f(x - 3)$ ,

(....., .....

(ii)  $y = f(x) - 5$ ,

(....., .....

(iii)  $y = -f(x)$ ,

(....., .....

(iv)  $y = f(2x)$ .

(....., .....

**(4)**

The curve with equation  $y = x^2$  has been translated to give the curve  $y = f(x)$ .

- (b) Find  $f(x)$  in terms of  $x$ .

$f(x) = \dots\dots\dots$

**(4)**

**TOTAL FOR PAPER: 100 MARKS**

**END**

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