

Surname	Centre Number	Candidate Number
Other Names		0



GCSE

4352/02

**MATHEMATICS (UNITISED SCHEME)
UNIT 2: NON-CALCULATOR MATHEMATICS
HIGHER TIER**

A.M. WEDNESDAY, 13 June 2012

1 $\frac{1}{4}$ hours

**CALCULATORS ARE
NOT TO BE USED
FOR THIS PAPER**

INSTRUCTIONS TO CANDIDATES

Use black ink or black ball-point pen. Do not use gel pen or correction fluid.

Write your name, centre number and candidate number in the spaces at the top of this page.

Answer **all** the questions in the spaces provided.

If you run out of space, use the continuation page at the back of the booklet, taking care to number the question(s) correctly.

Take π as 3.14.

INFORMATION FOR CANDIDATES

You should give details of your method of solution when appropriate.

Unless stated, diagrams are not drawn to scale.

Scale drawing solutions will not be acceptable where you are asked to calculate.

The number of marks is given in brackets at the end of each question or part-question.

You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question 6.

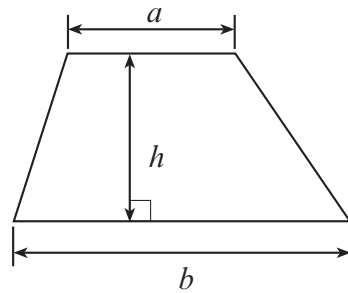
For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1	5	
2	4	
3	3	
4	8	
5	4	
6	7	
7	5	
8	8	
9	3	
10	4	
11	5	
12	5	
13	4	
TOTAL MARK		



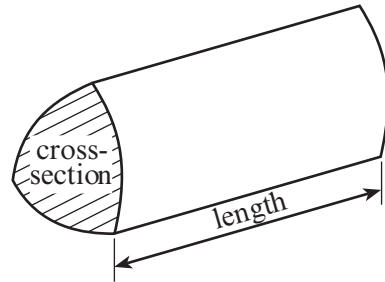
J U N 1 2 4 3 5 2 0 2 0 1

Formula List

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

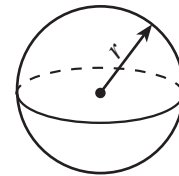


$$\text{Volume of prism} = \text{area of cross-section} \times \text{length}$$



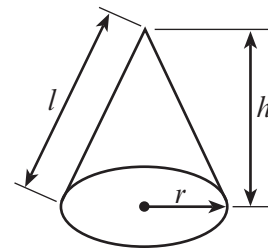
$$\text{Volume of sphere} = \frac{4}{3}\pi r^3$$

$$\text{Surface area of sphere} = 4\pi r^2$$



$$\text{Volume of cone} = \frac{1}{3}\pi r^2 h$$

$$\text{Curved surface area of cone} = \pi r l$$

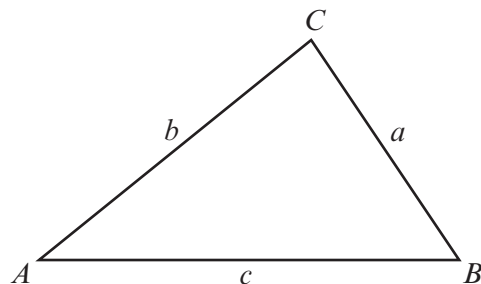


In any triangle ABC

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

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

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



The Quadratic Equation

The solutions of $ax^2 + bx + c = 0$

where $a \neq 0$ are given by

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



1. Hamish is in London one Tuesday afternoon. He looks at the world clock shown below.

World clock		
London	New York	Sydney
13:38 Tuesday	08:38 Tuesday	21:38 Tuesday

- (a) Hamish has a plane to catch in 6 hours 34 minutes time. At what time does his plane leave, in New York time?

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[2]

- (b) Hamish decides to make a telephone call to Sydney before he leaves. He makes the call at 17:05 in London. What time and day is this in Sydney?

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Time Day

[3]

2. (a) The n th term of a sequence is $n^2 + 25$. Find the first three terms of the sequence.

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[2]

- (b) Find the next term in the sequence 8, 9, 13, 22, 38,

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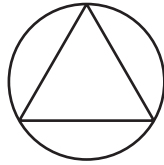
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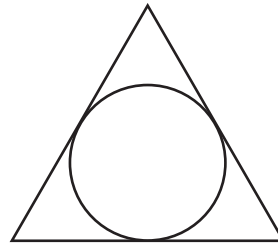
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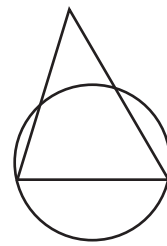
A



B



C



D

Match each statement in the table with one of the diagrams shown above.

Statement	Diagram
All three sides of the triangle are tangents to the circle	
All the vertices of the triangle touch the circle	
Only one side of the triangle is a chord of the circle	

[3]

4. (a) Solve $\frac{40}{5x} = 4$.

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[2]

(b) Solve $3(2x - 5) > 21$.

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[3]



(c) Make g the subject of the formula $3g^2 - f = 0$.

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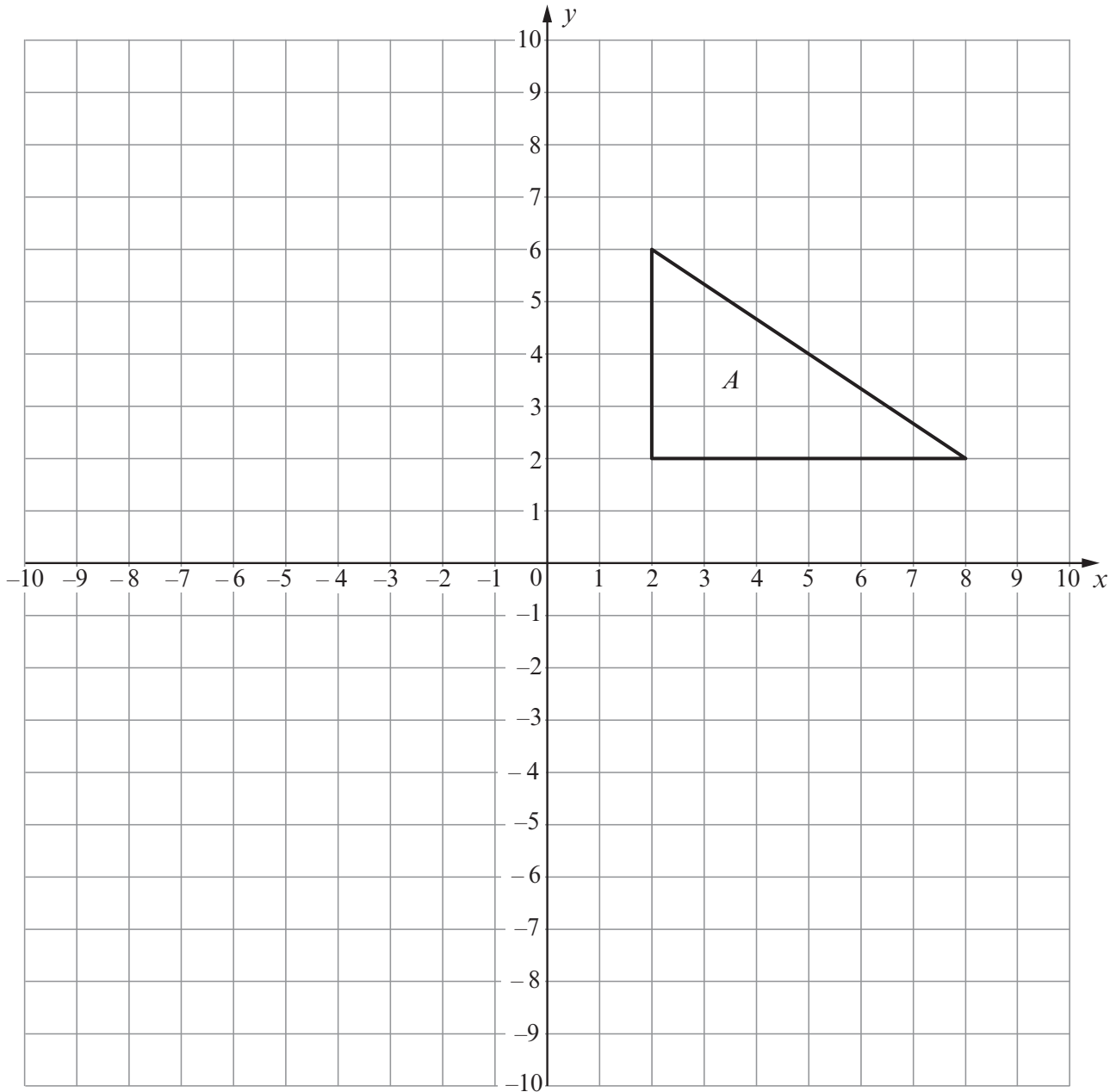
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[3]

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5. Reflect triangle A in the x -axis and label your answer B .
Then rotate your triangle B by 90° clockwise about the origin.
Label your final answer C .



[4]



(b) Calculate the probability that George only hits the centre of the target once.

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[3]

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8. An experiment was carried out to investigate the probability of obtaining an even number when a biased dice is thrown. The number of even numbers obtained in each of 5 sets of 20 throws is shown in the table below.

	Number of times an even number is recorded
First set of 20 throws	14
Second set of 20 throws	8
Third set of 20 throws	14
Fourth set of 20 throws	16
Fifth set of 20 throws	10

- (a) Complete the table below to show the relative frequency of an even number occurring after throwing the dice a total of 20 times, 40 times, 60 times, 80 times and 100 times.

Number of times the dice is thrown altogether		20	40	60	80	100
Relative frequency of obtaining an even number	Fraction	$\frac{14}{20}$				
	Decimal					

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[3]

- (b) Using the above results, write down the best estimate for the probability of obtaining an even number when this biased dice is thrown. Give a reason for your answer.

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[2]



(c) Explain what you think might happen to the relative frequency if the experiment was continued with more throws of the biased dice.

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[1]

(d) What would be your best estimate of the probability of obtaining an odd number on this biased dice?

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[2]

9. A sheet of card is 0.09 mm thick.
Find the thickness of the card **in metres**, expressing your answer in standard form.
You must show all your working.

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[3]



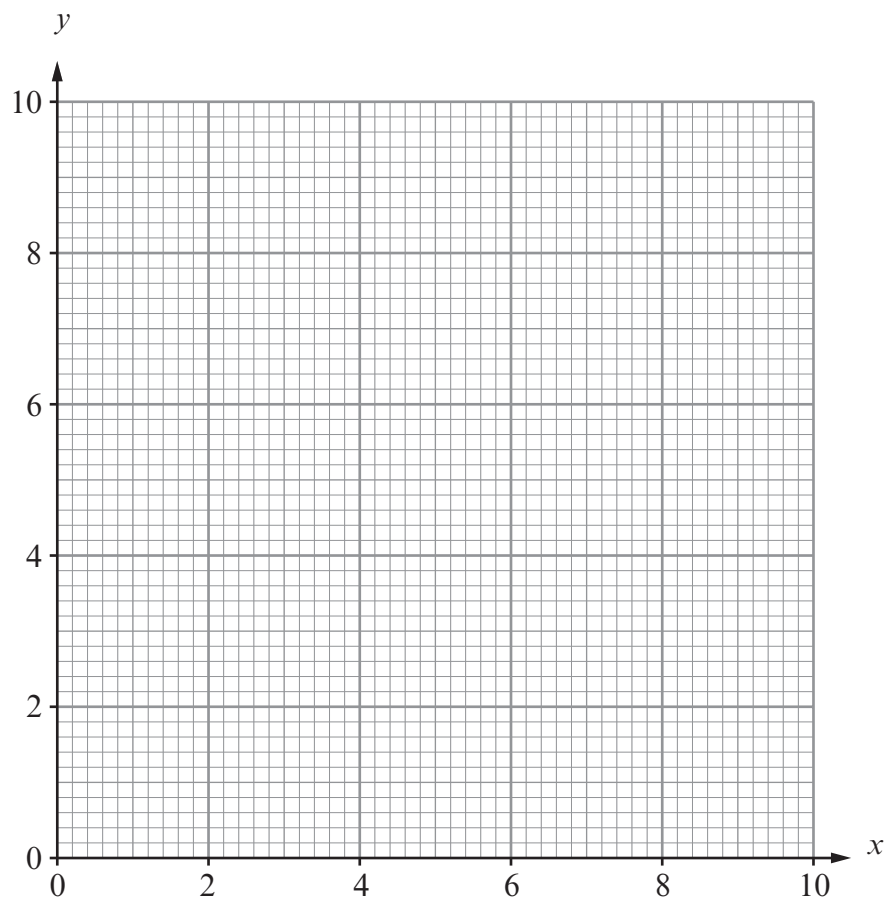
10. A cutting machine has two settings, x and y .
For safety in operating the cutting machine, the settings x and y must be selected so that all the inequalities below are satisfied.

$$x + y < 8$$

$$5x + y > 10$$

$$2y - x > 4$$

- (a) Use the graph paper below to identify the region that shows the safe settings of x and y for the cutting machine.



[3]

- (b) Write down a set of possible safe settings for the cutting machine.

$x = \dots\dots\dots$ and $y = \dots\dots\dots$

[1]



11. The diagram shows a circle with centre O and a tangent PT that touches the circle at C .

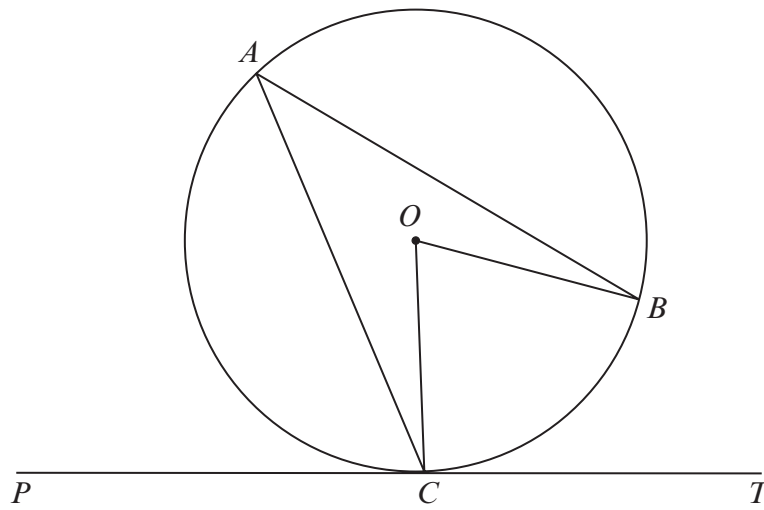


Diagram not drawn to scale

The reflex angle at the centre of the circle is 280° .
Find the size of each of the following angles.
You must give a reason for each answer.

(a) \widehat{BAC}

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[2]

(b) \widehat{BCP}

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[3]



12. (a) Complete the table shown below and draw the graph of the curve $y = 2^x$ for values of x from -2 to $+2$.

x	-2	-1	0	1	2
$y = 2^x$	$\frac{1}{4}$			2	4

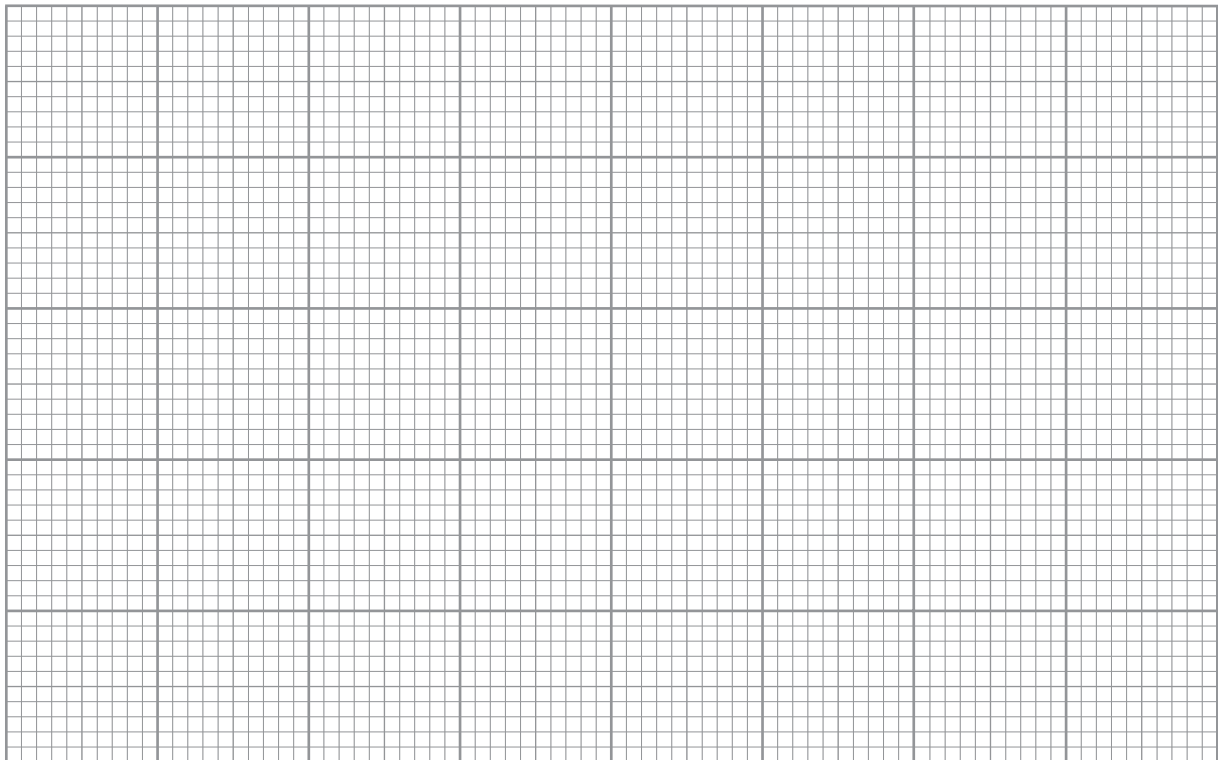
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[3]



(b) Use your graph to solve $2^x = 3$.

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[1]

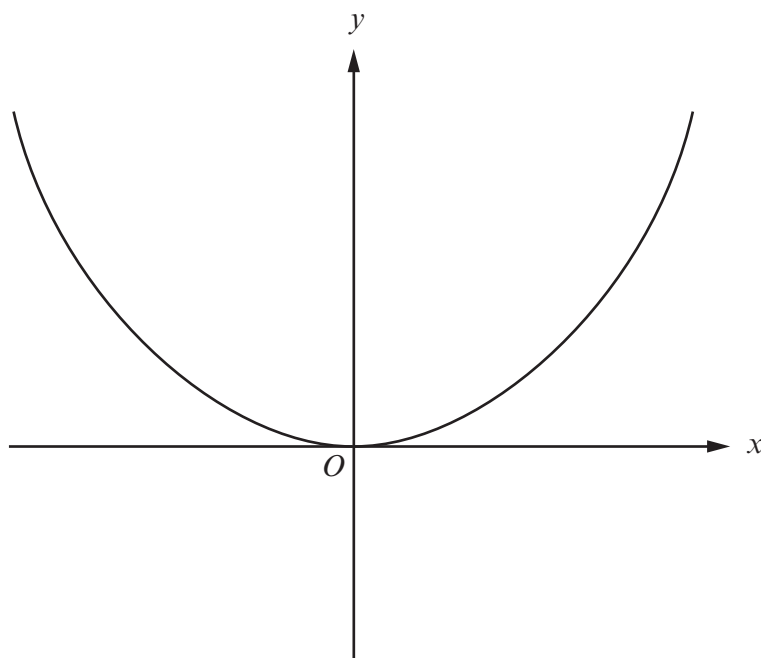
(c) Find the value of $2^{0.5}$.

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[1]

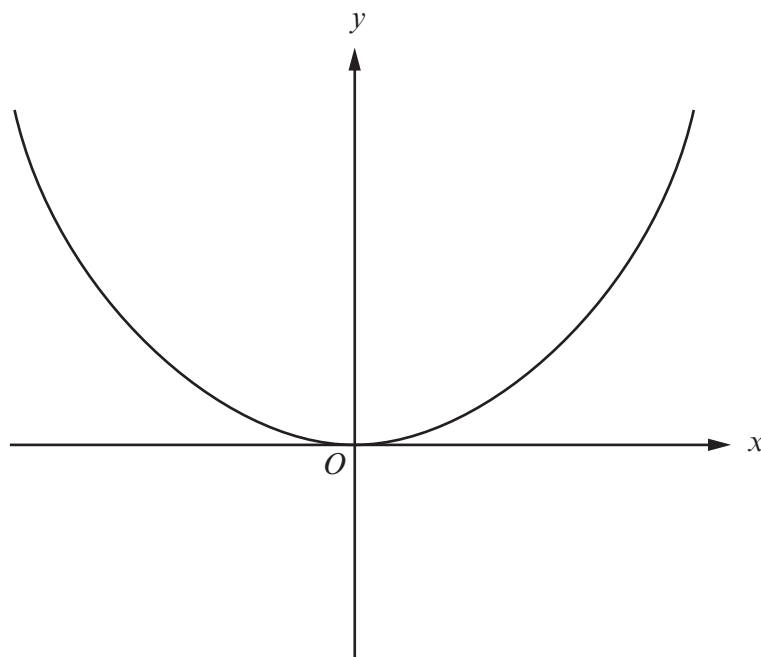


13. (a) The diagram shows a sketch of $y = x^2$.
On the same diagram, sketch the curve $y = x^2 + 3$.
Mark clearly the coordinates of one point where the curve meets or crosses an axis.



[2]

- (b) The diagram shows a sketch of $y = x^2$.
On the same diagram, sketch the curve $y = (x + 3)^2$.
Mark clearly the coordinates of one point where the curve meets or crosses an axis.



[2]



