

Surname	Centre Number	Candidate Number
Other Names		0



**GCSE**

4352/02

**MATHEMATICS (UNITISED SCHEME)  
UNIT 2: Non-Calculator Mathematics  
HIGHER TIER**

A.M. WEDNESDAY, 15 January 2014

1 hour 15 minutes

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

**ADDITIONAL MATERIALS**

A ruler, a protractor and a pair of compasses may be required.

**INSTRUCTIONS TO CANDIDATES**

Use black ink or black ball-point pen.

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.

Take  $\pi$  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.

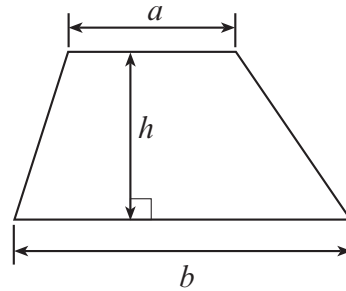
You are reminded that assessment will take into account the quality of written communication (including mathematical communication) used in your answer to question 3.

For Examiner's use only		
Question	Maximum Mark	Mark Awarded
1.	3	
2.	4	
3.	8	
4.	4	
5.	3	
6.	6	
7.	3	
8.	4	
9.	3	
10.	3	
11.	5	
12.	4	
13.	3	
14.	6	
15.	3	
16.	3	
<b>Total</b>	<b>65</b>	

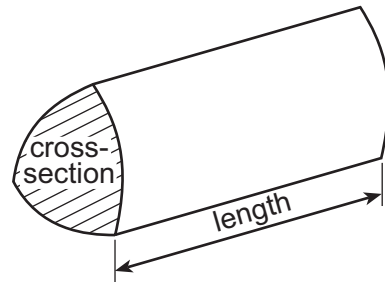
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## Formula List

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

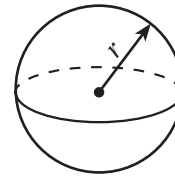


**Volume of prism** = area of cross-section  $\times$  length



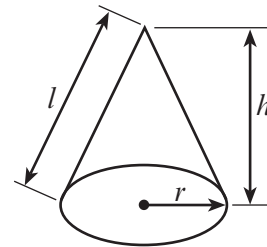
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

**Surface area of sphere** =  $4\pi r^2$



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

**Curved surface area of cone** =  $\pi r l$

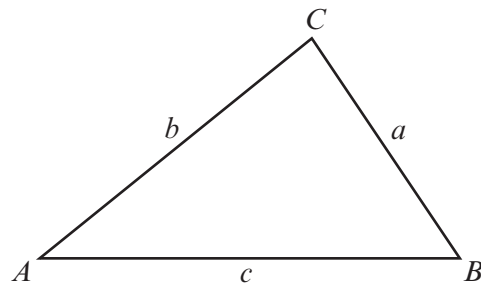


In any triangle  $ABC$

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

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

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



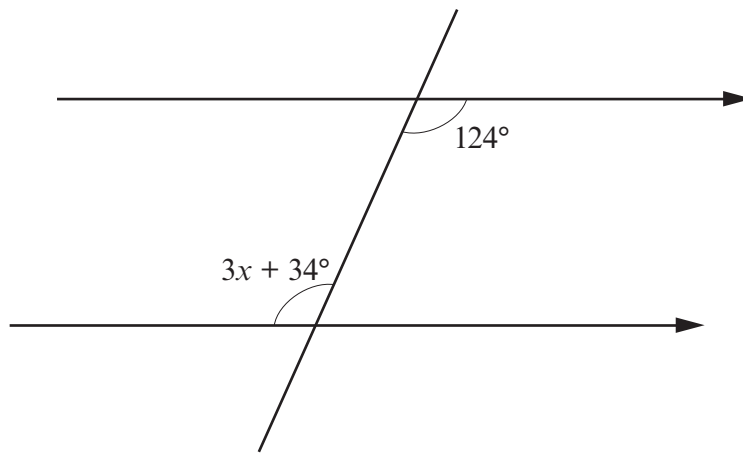
### The Quadratic Equation

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.



*Diagram not drawn to scale*

Use the information in the diagram above to find the value of  $x$ .

[3]

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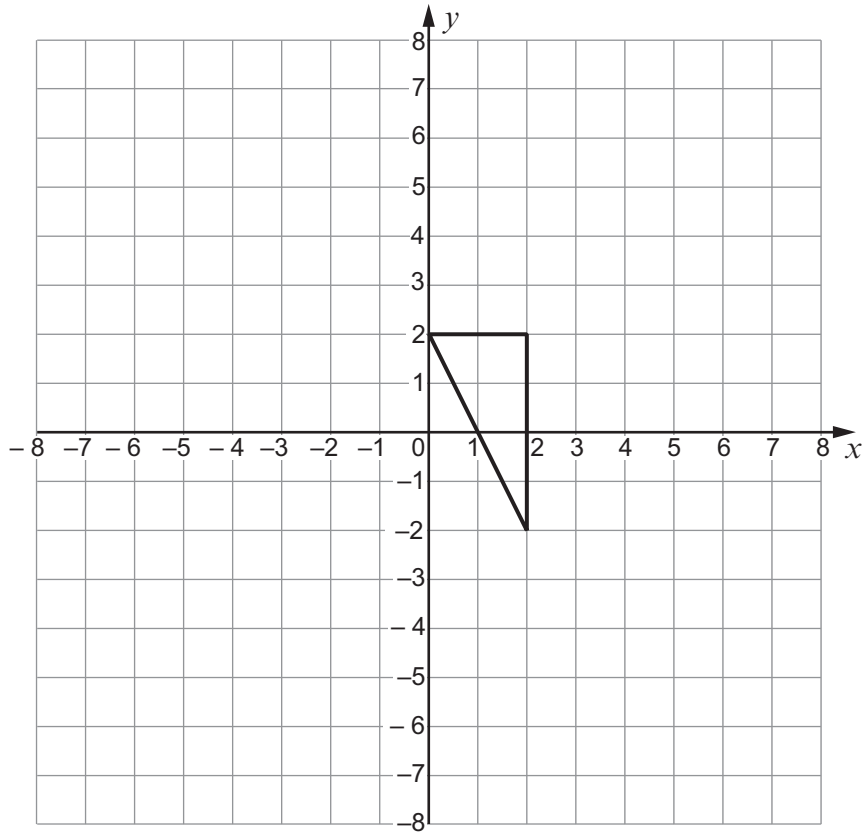
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$$x = \text{.....}^\circ$$

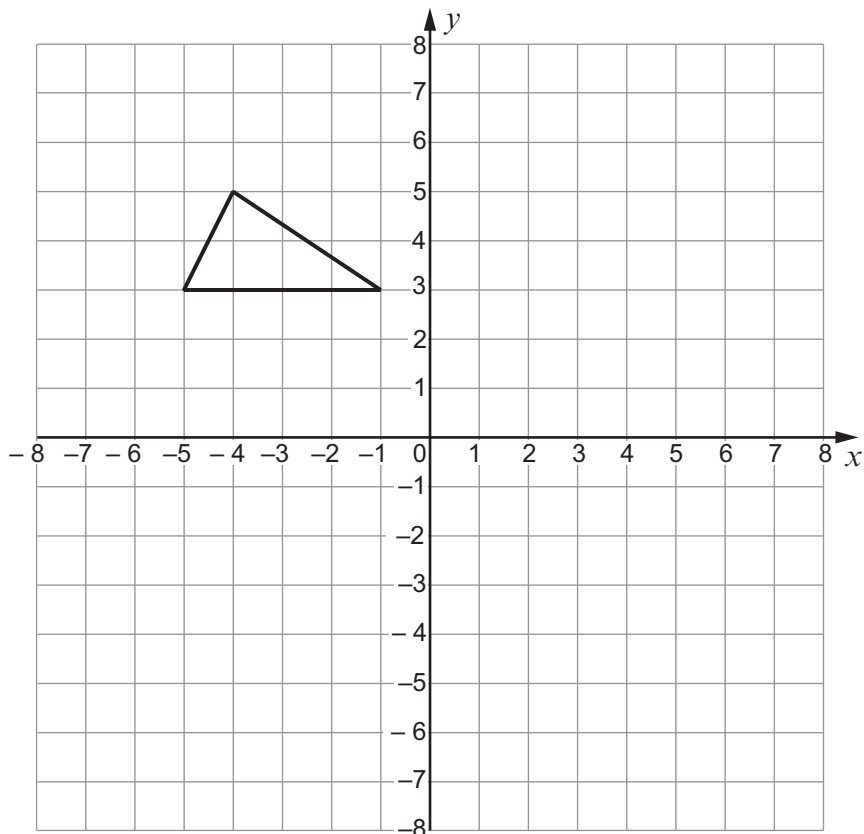
2. (a) Reflect the triangle in the line  $x = -2$ .

[2]



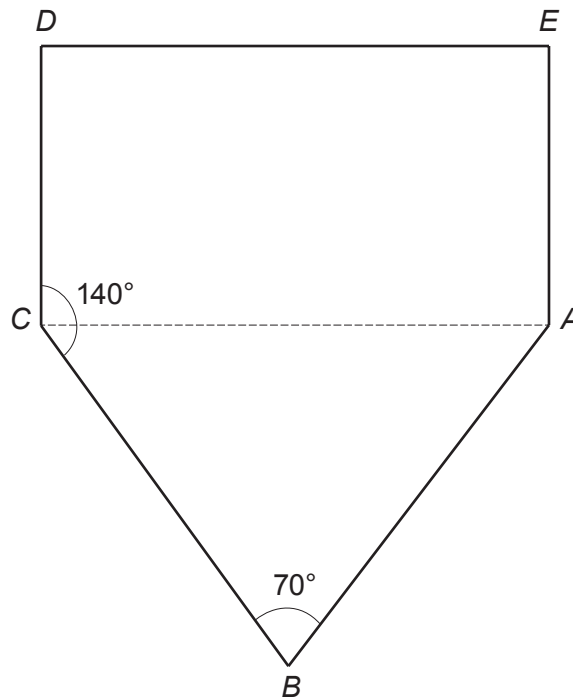
- (b) Rotate the triangle clockwise through  $90^\circ$  about the point with coordinates (0, 2).

[2]





4.



*Diagram not drawn to scale*

In this diagram,  $ACDE$  is a rectangle,  $\widehat{ABC} = 70^\circ$  and  $\widehat{BCD} = 140^\circ$ .  
Using the given information, explain why the length of  $AB$  is **not** equal to the length of  $BC$ .  
You must show all your working.

[4]

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5. Yellow, blue and green tickets are sold in a raffle to raise money for charity.  
The probability of the winning ticket being a particular colour is given in the following table.

Colour of ticket	Yellow	Blue	Green
Probability	$2a$	$0.4$	$3a$

Find the probability that the winning ticket is green.

[3]

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6. The table shows values of  $y = x^3 + 1$  for values of  $x$  from  $-3$  to  $3$ .

$x$	$-3$	$-2$	$-1$	$0$	$1$	$2$	$3$
$y = x^3 + 1$	$-26$	$-7$		$1$	$2$		$28$

- (a) Complete the table above.

[2]

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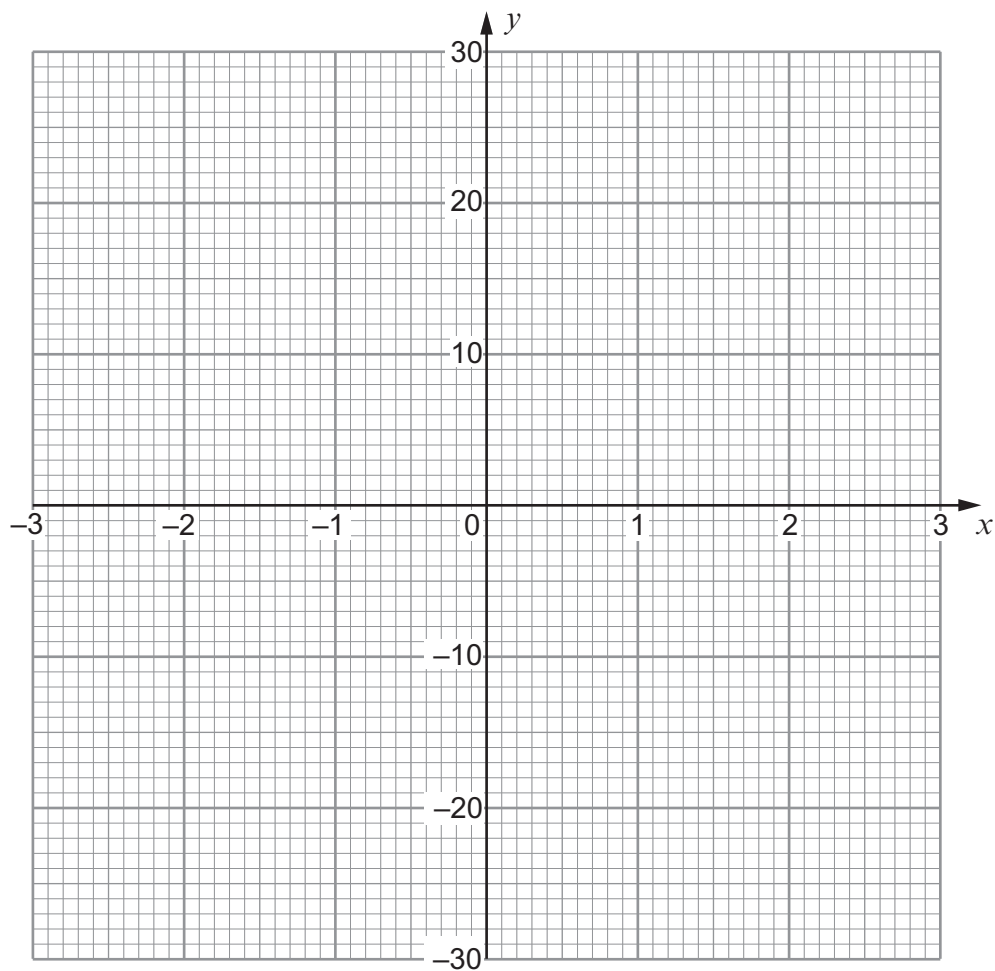
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- (b) On the graph paper below, draw the graph of  $y = x^3 + 1$  for the values of  $x$  from  $-3$  to  $3$ .

[2]



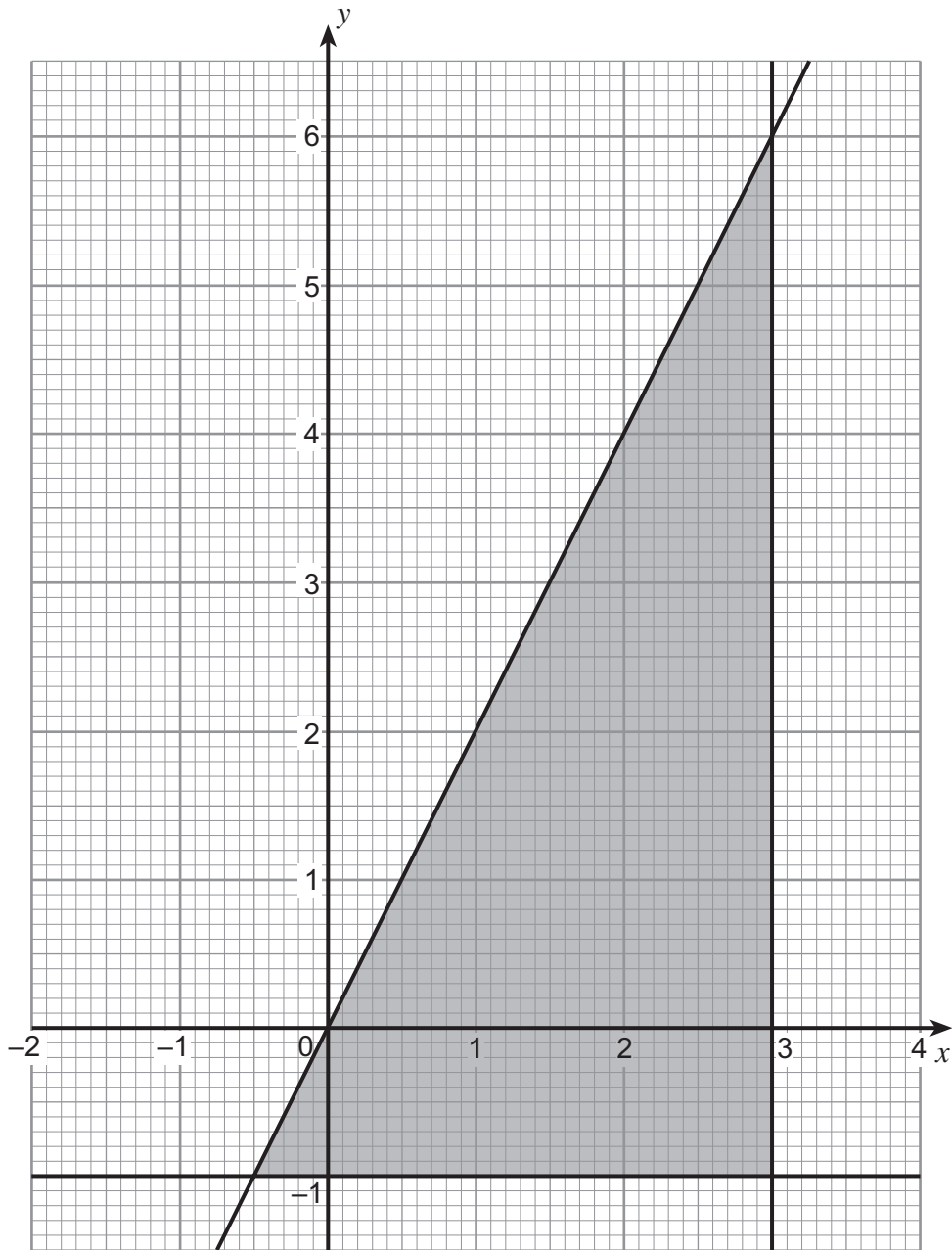


- (c) Draw the line  $y = -10$  on your graph paper and write down the  $x$ -coordinate of the point where this line intersects the curve  $y = x^3 + 1$ . [2]

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7.



Complete the following table to give the set of inequalities that describes the shaded region drawn above. [3]

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$x \leq 3$

8. When dropped onto the floor, a drawing pin will either land on its side or on its head (with the pin pointing upwards).

Three friends, Ahmed, Maxine and Dewi, are conducting an experiment to determine the probability that a drawing pin lands on its head when dropped onto the floor. They each drop a drawing pin a number of times. Their results are given in the following table.

Name	Ahmed	Maxine	Dewi
Number of drops	90	35	75
Number of heads	52	19	57

- (a) The three friends decide to combine their results to estimate the probability that a drawing pin lands on its head.  
Show clearly how they should reach their answer.  
Give the final answer **as a decimal**. [3]

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- (b) Suggest a way in which they could improve their estimate. [1]

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9. Solve the following equation.

[3]

$$\frac{5x-1}{2} - x = \frac{1}{2}$$

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10. The mass of the planet Jupiter is  $1.9 \times 10^{27}$  kg.

The mass of the planet Venus is  $4.87 \times 10^{24}$  kg.

**Approximately** how many times bigger is the mass of Jupiter than the mass of Venus? [3]

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13. Make  $p$  the subject of the following formula.

[3]

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$$t + 6p = 5 - pq$$

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14. (a) Evaluate  $8^{-\frac{2}{3}}$ .

[2]

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(b) Express  $0.00\dot{4}$  as a fraction.

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(c) Simplify  $(4 + \sqrt{3})^2$ .

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15. A bag contains four red counters and four yellow counters.  
Three counters are picked from the bag at random, **without** being replaced.

Find the probability that the three counters picked are of the same colour.

[3]

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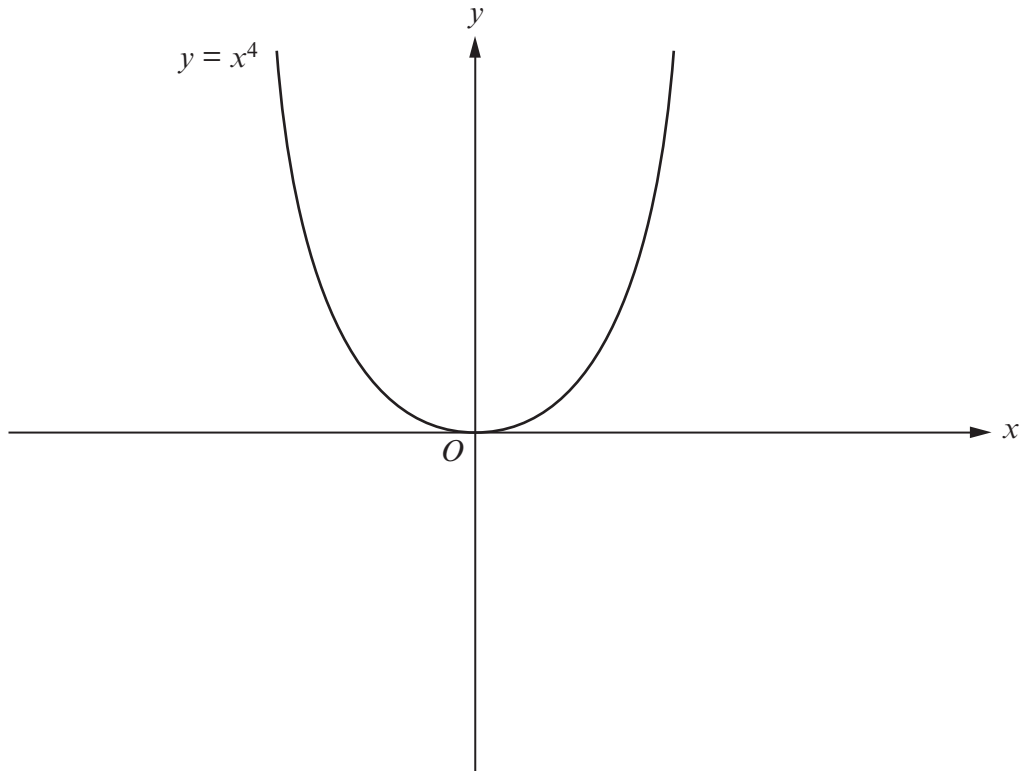
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16. The diagram shows a sketch of  $y = x^4$ .  
On the same diagram, sketch the curves  $y = -x^4$  and  $y = -x^4 - 3$ .  
Clearly label each graph with its equation, and indicate the coordinates of any point where a curve crosses an axis. [3]



**END OF PAPER**