Surname		Other Names	
Centre Number			Candidate Number									
Candidate Signature												

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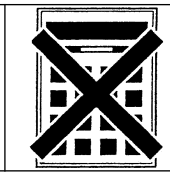
General Certificate of Secondary Education
November 2005

ASSESSMENT and QUALIFICATIONS ALLIANCE

MATHEMATICS (MODULAR) (SPECIFICATION B) 33005/I1
Module 5 Intermediate Tier
Paper 1 Non-Calculator

Tuesday 8 November 2005 9.00 am to 10.15 am

In addition to this paper you will require:
mathematical instruments.
You must **not** use a calculator.



Time allowed: 1 hour 15 minutes

Instructions
- Use blue or black ink or ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions in the spaces provided.
- Do all rough work in this booklet.

Information
- The maximum mark for this paper is 70.
- Mark allocations are shown in brackets.
- Additional answer paper, graph paper and tracing paper will be issued on request and must be tagged securely to this answer booklet.

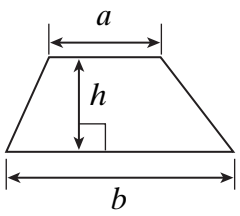
Advice
- In all calculations, show clearly how you work out your answer.

For Examiner's Use	
Pages	Mark
3	
4 – 5	
6 – 7	
8 – 9	
10 – 11	
12 – 13	
14 – 15	
16 – 17	
18 – 19	
20	
TOTAL	
Examiner's Initials	

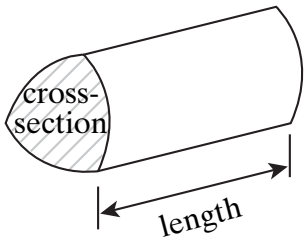
Formulae Sheet: Intermediate Tier

You may need to use the following formulae:

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



Volume of prism = area of cross-section × length



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

1 Work out

(a) 5^3

.....

Answer ..... *(1 mark)*

(b) $\frac{8^2}{2^3}$

.....

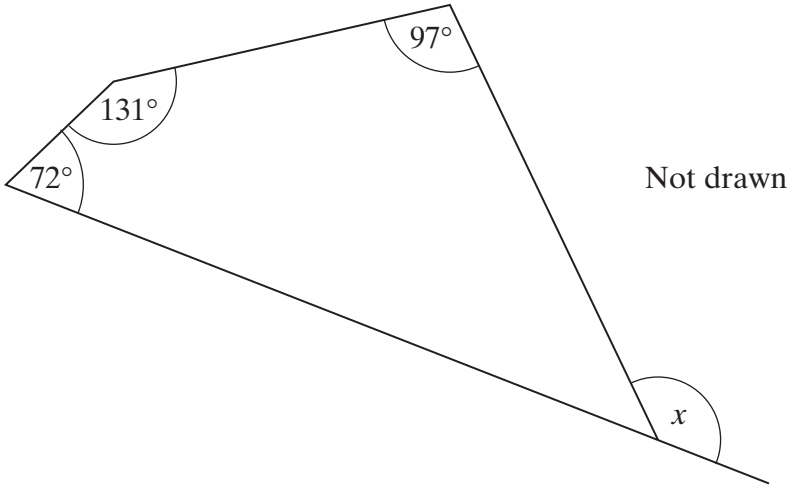
.....

Answer ..... *(2 marks)*

TURN OVER FOR THE NEXT QUESTION

3

2 (a) The diagram shows a quadrilateral.



Not drawn accurately

Work out the value of x.

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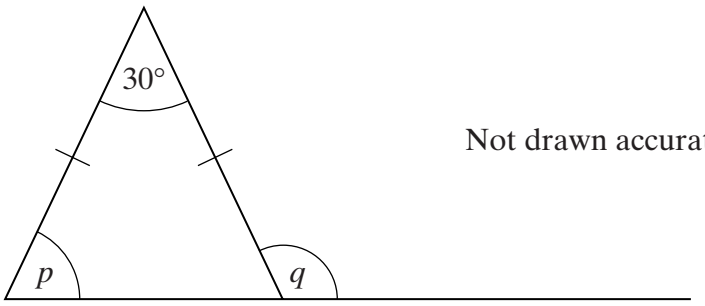
Answer ..... degrees *(3 marks)*

(b) The diagram shows an isosceles triangle.



Not drawn accurately

(i) Work out the value of p.

.....

.....

Answer ..... degrees *(2 marks)*

(ii) Work out the value of q.

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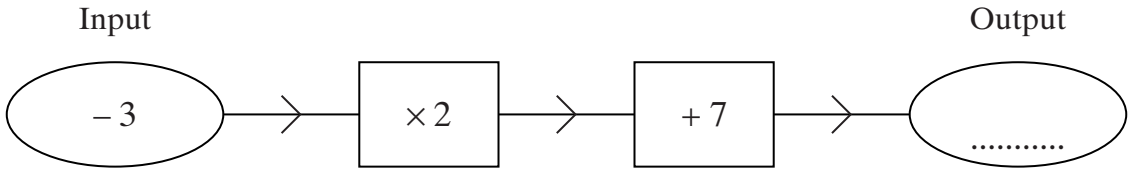
Answer ..... degrees *(1 mark)*

TURN OVER FOR THE NEXT QUESTION

6

3 (a) Here is a number machine.



The input is –3.

What is the output?

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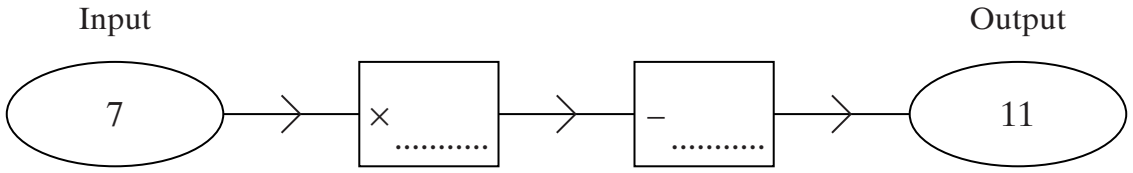
Answer ..... *(1 mark)*

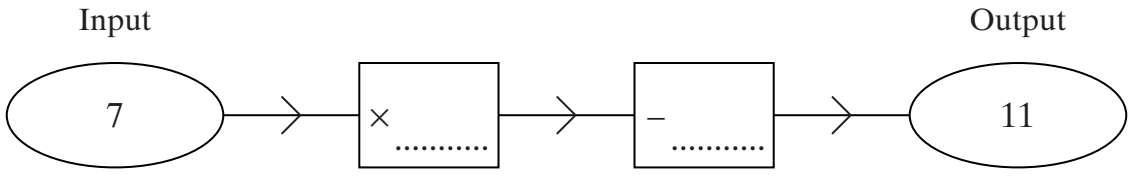
(b) Here are two different number machines.
They both have an input of 7 and an output of 11.

(i) Complete the boxes to make this machine work.



(1 mark)

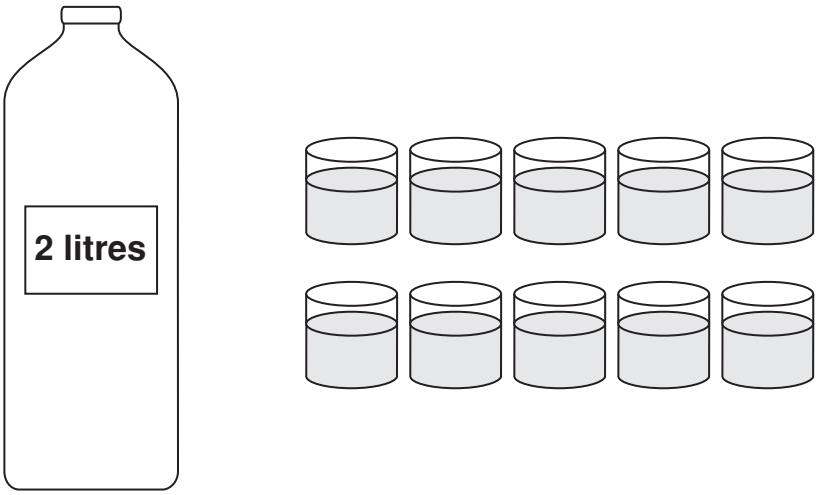
(ii) Complete the boxes to make this different machine work.



(1 mark)

4 A bottle contains 2 litres of water.
1 litre = 1000 cm^3
The water is shared equally into 10 identical cups.

Each cup is $\frac{2}{3}$ full.



How much will a cup hold when it is full?
Give your answer in cm^3.
You **must** show your working.

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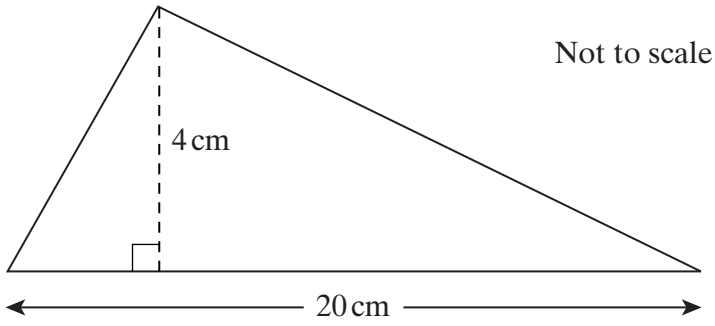
Answer ..... cm^3 *(4 marks)*

7

5 (a) The diagram shows a triangle with base 20 cm and perpendicular height 4 cm.



Calculate the area of the triangle.
State the units of your answer.

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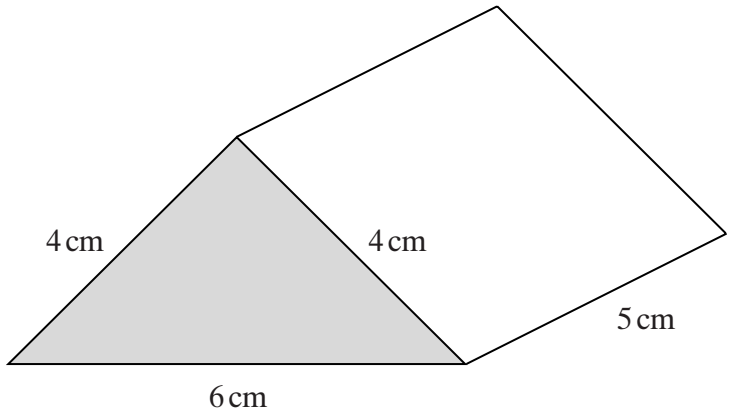
Answer ..... *(3 marks)*

(b) The diagram shows a triangular prism.



Not to scale

(i) Sketch the plan view of the prism.

(1 mark)

(ii) The area of the cross-section is 9.1 cm^2.

Work out the volume of the triangular prism.

.....

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.....

Answer ..... cm^3 *(2 marks)*

6

Turn over ▶

6 Here is a number sequence.

1 3 6 10 15

(a) Write down the next **two** numbers in the sequence.

.....

Answer ..... *(2 marks)*

(b) Describe a rule for continuing the sequence.

.....

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(1 mark)

(c) (i) Work out the value of $x^2 + x$ when $x = 5$

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Answer ..... *(1 mark)*

(ii) Factorise $x^2 + x$

.....

Answer ..... *(1 mark)*

(iii) Darren says that $x^2 + x$ is always even.

Using your answer to part (ii), or otherwise, explain why this is true.

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(2 marks)

7 (a) Simplify $2a + 3b + 5a + b$

.....

Answer ..... *(2 marks)*

(b) Simplify $2p \times 4q$

.....

Answer ..... *(1 mark)*

(c) Expand and simplify $2(3x + 1) - 5(x - 2)$

.....

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.....

Answer ..... *(2 marks)*

(d) Simplify $6xy^2 \times x^2y^4$

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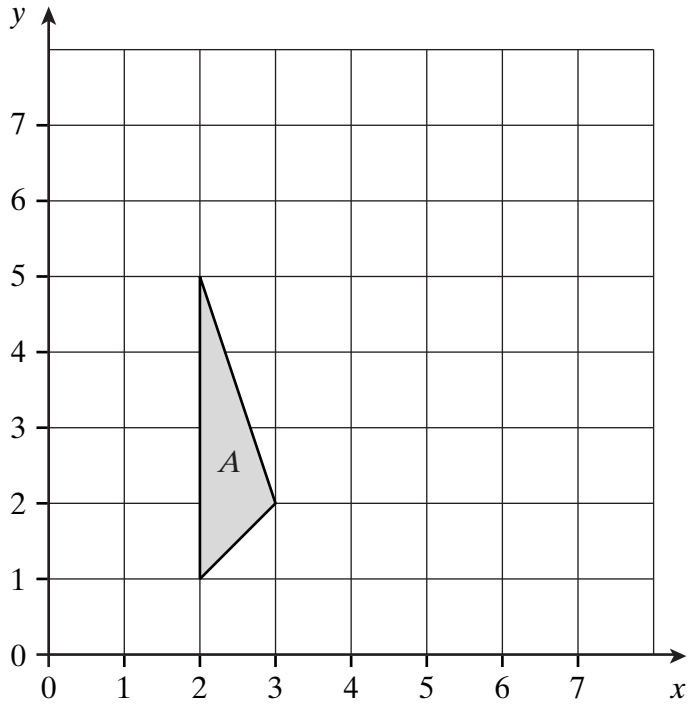
Answer ..... *(2 marks)*

TURN OVER FOR THE NEXT QUESTION

8 (a) The grid shows a triangle A.

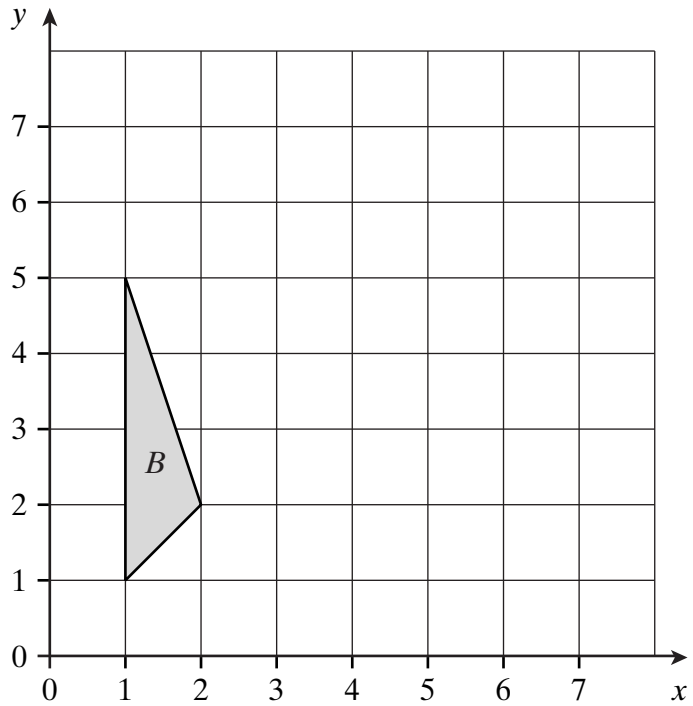
Reflect triangle A in the line $x = 3$



(2 marks)

(b) The grid shows a triangle B.

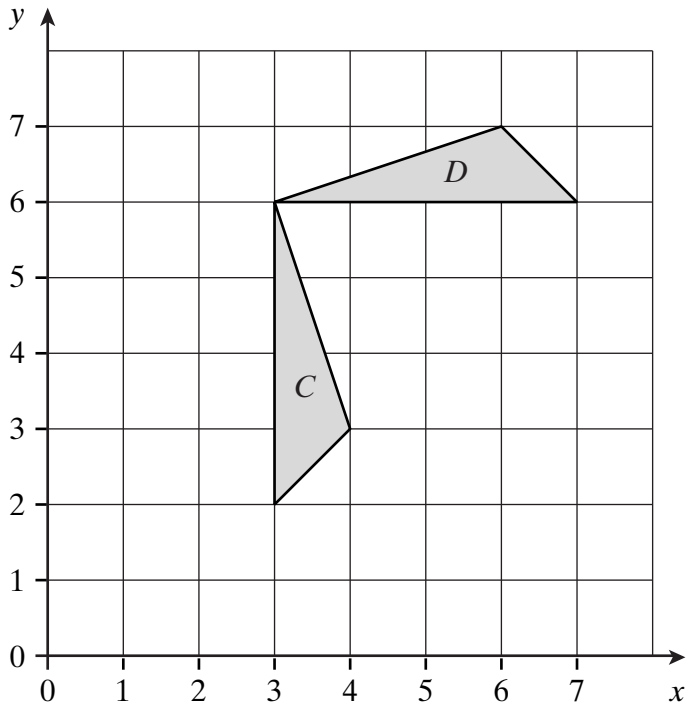
Translate triangle B, 3 squares to the right and 2 squares up.



(1 mark)

(c) The grid shows triangles *C* and *D*.

Describe the **single** transformation which maps triangle *C* to triangle *D*.



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(3 marks)

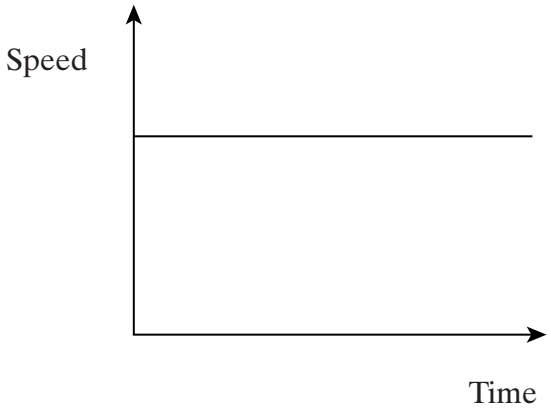
TURN OVER FOR THE NEXT QUESTION

6

9 The graphs show two parts of a train journey.

Describe in words what is happening in each part.

(a)



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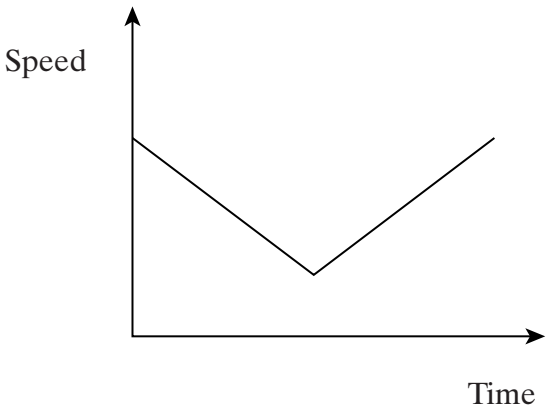
(1 mark)

(b)



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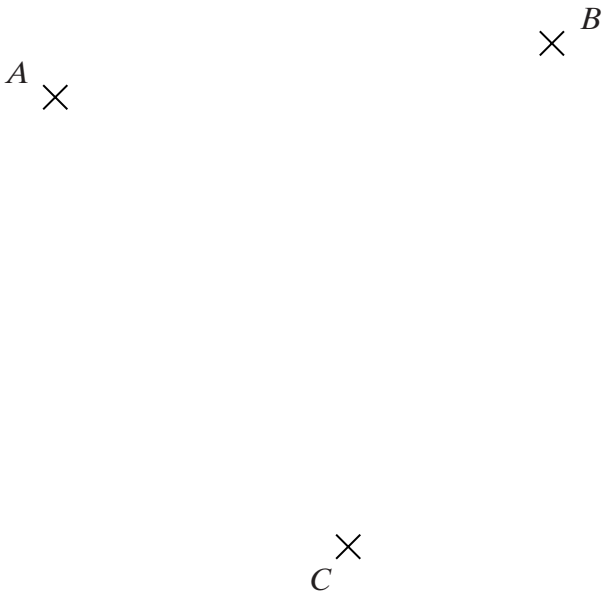
(2 marks)

10 The diagram shows three towns A, B and C.
1 cm represents 2 km.

Show on the diagram the region which is less than 10 km from all three towns.

Scale: 1 cm represents 2 km



(3 marks)

6

Turn over ▶

11 (a) Complete the table of values for the graph of $y = x^3 + 2x$

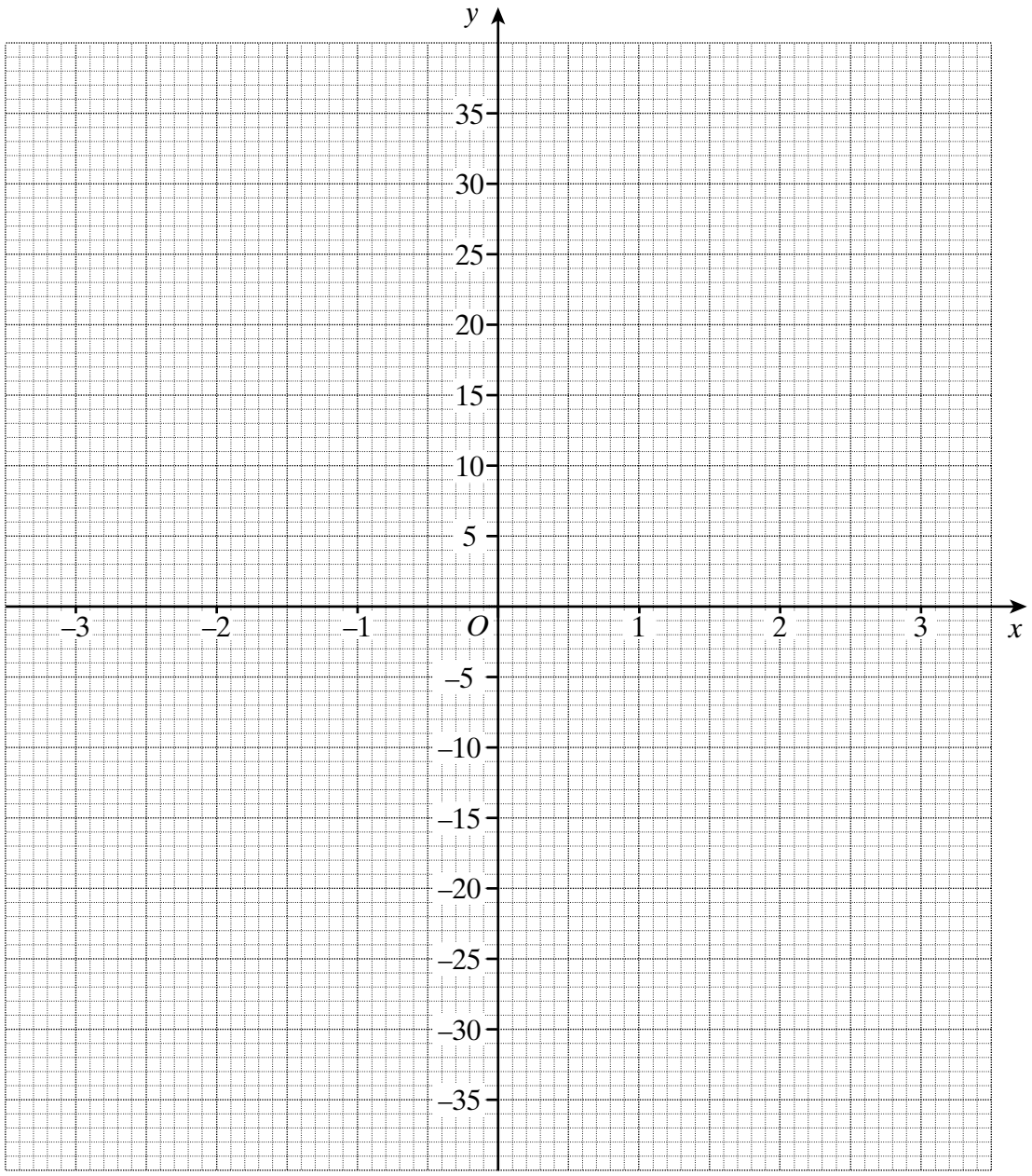
x	–3	–2	–1	0	1	2	3
y		–12	–3			12	33

.....

.....

(2 marks)

(b) On the grid, draw the graph of $y = x^3 + 2x$ for values of x from –3 to +3.



(3 marks)

(c) Use your graph to write down the value of $x^3 + 2x$ when $x = -1.5$

Answer ..... *(1 mark)*

(d) Use the graph to solve $x^3 + 2x = 20$

Answer ..... *(1 mark)*

12 Choose the correct word from the list to describe the following.

Equation Formula Identity Expression Inequality

(a) $2x + 6$

Answer ..... *(1 mark)*

(b) $2y + 7 = 18$

Answer ..... *(1 mark)*

(c) $A = \pi r^2$

Answer ..... *(1 mark)*

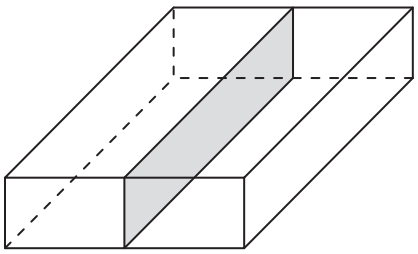
TURN OVER FOR THE NEXT QUESTION

10

13 Each diagram shows the same cuboid.
The length, width and height of the cuboid are all different.
A plane cuts each cuboid into two equal parts.

For each diagram state whether the plane is a plane of symmetry.

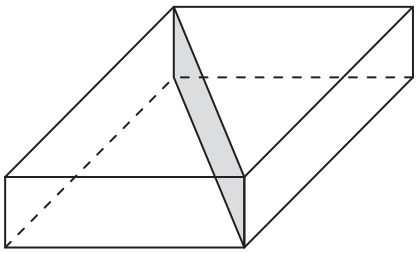
(a)



Drawn to scale

Answer ..... *(1 mark)*

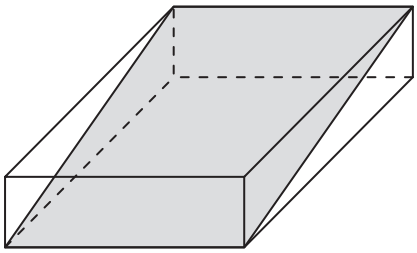
(b)



Drawn to scale

Answer ..... *(1 mark)*

(c)



Drawn to scale

Answer ..... *(1 mark)*

14 (a) x is an integer.

$$0 < x \leqslant 3$$

Write down all the possible values of x.

.....

Answer ..... *(2 marks)*

(b) x and y are integers.

$$0 < x \leqslant 3$$
$$y < x$$
$$x + y < 5$$

Write down **two** pairs of values of x and y which satisfy all three inequalities.

.....

.....

.....

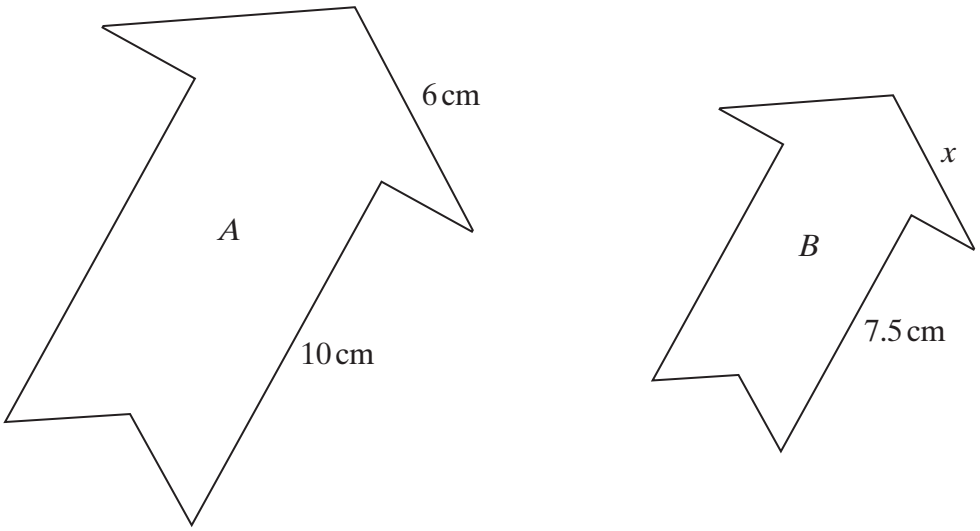
Answer (..... , ...) and (..... , ...) *(2 marks)*

TURN OVER FOR THE NEXT QUESTION

7

15 The diagrams show two similar shapes *A* and *B*.

Not to scale



(a) Work out the value of *x*.

.....

.....

.....

Answer ..... cm *(3 marks)*

(b) The perimeter of shape *B* is 30 cm.

Work out the perimeter of shape *A*.

.....

.....

.....

Answer ..... cm *(2 marks)*

END OF QUESTIONS

5