Surname		Other Names	
Centre Number			Candidate Number									
Candidate Signature												

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General Certificate of Secondary Education
November 2006

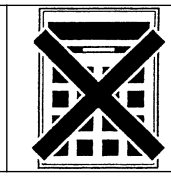
MATHEMATICS (MODULAR) (SPECIFICATION B) 33005/I1
Module 5 Intermediate Tier
Paper 1 Non-Calculator

ASSESSMENT and QUALIFICATIONS ALLIANCE

Tuesday 7 November 2006 9.00 am to 10.15 am

For this paper you must have:
- 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.
- Answer the questions in the spaces provided.
- Do all rough work in this book.

Information
- The maximum mark for this paper is 70.
- The marks for questions are shown in brackets.
- You may ask for more answer paper, graph paper and tracing paper. This must be tagged securely to this answer book.

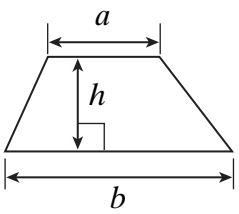
Advice
- In all calculations, show clearly how you work out your answer.

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

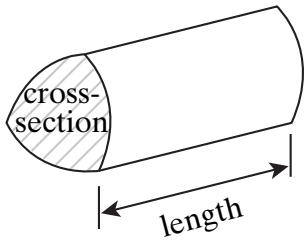
Formulae Sheet: Intermediate Tier

You may need to use the following formulae:

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



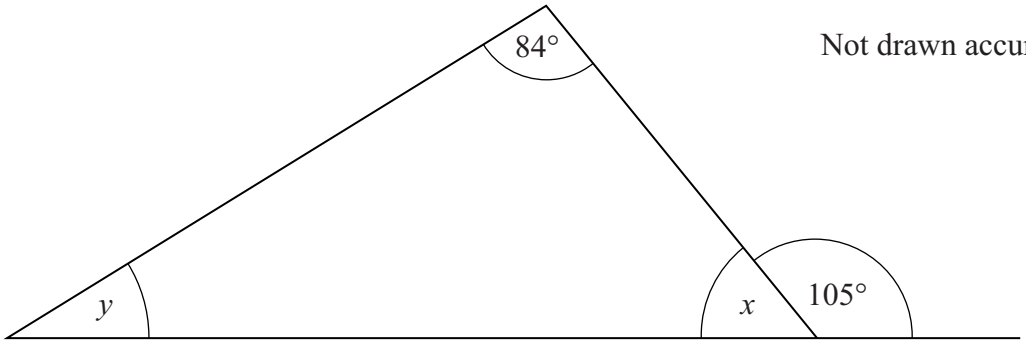
Volume of prism = area of cross-section × length



LEAVE MARGIN BLANK

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

1 The diagram shows a triangle.



(a) Work out the value of x.

.....

.....

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

(b) Work out the value of y.

.....

.....

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

Turn over for the next question

3

2 A model of a new housing estate is built to a scale of 1 : 500

(a) A road on the model is 70 centimetres long.

Work out the actual length of the road.
Give your answer in metres.

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.....

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

(b) A house is 10 metres high.

Work out the height of the model of this house.
Give your answer in centimetres.

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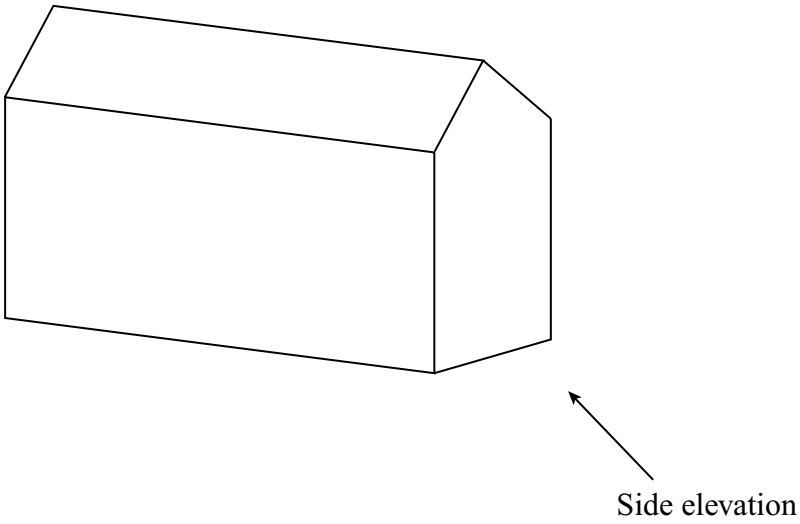
Answer ..... centimetres *(3 marks)*

(c) Here is a model of a house.



Complete the sentence.

The mathematical name of the shape of the side elevation

is a .....

(1 mark)

Turn over for the next question

7

3 (a) An ordinary dice has six faces.

Write down an expression for the total number of faces on x ordinary dice.

.....

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

(b) A tetrahedral dice has four faces.

Write down an expression for the total number of faces on x ordinary dice and 5 tetrahedral dice.

.....

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

(c) Tom has some dice.
An expression for the total number of faces on Tom's dice is $10y + 12$, where y is a whole number.

(i) Is the expression $10y + 12$ always odd, always even or could it be either?
Tick the correct box.

☐	☐	☐
Always odd	Always even	Could be either

(1 mark)

(ii) Explain your answer.

.....

.....

(1 mark)

(d) Solve the equation $10y + 12 = 42$

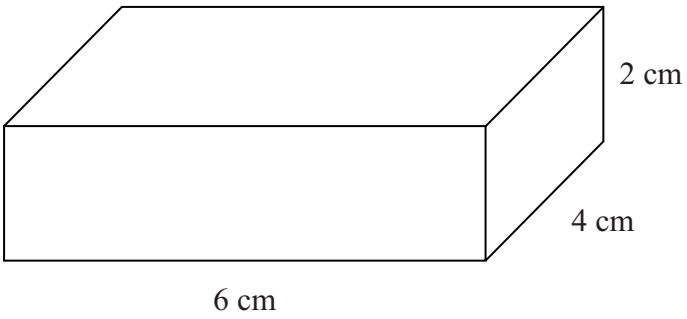
.....

.....

Answer $y =$ ..... *(2 marks)*

4 The diagram shows a cuboid.
The length is 6 cm.
The width is 4 cm.
The height is 2 cm.

Not drawn accurately



(a) Work out the volume of the cuboid.
State the units of your answer.

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

(b) How many of these cuboids are needed to make a cube of side 12 cm?

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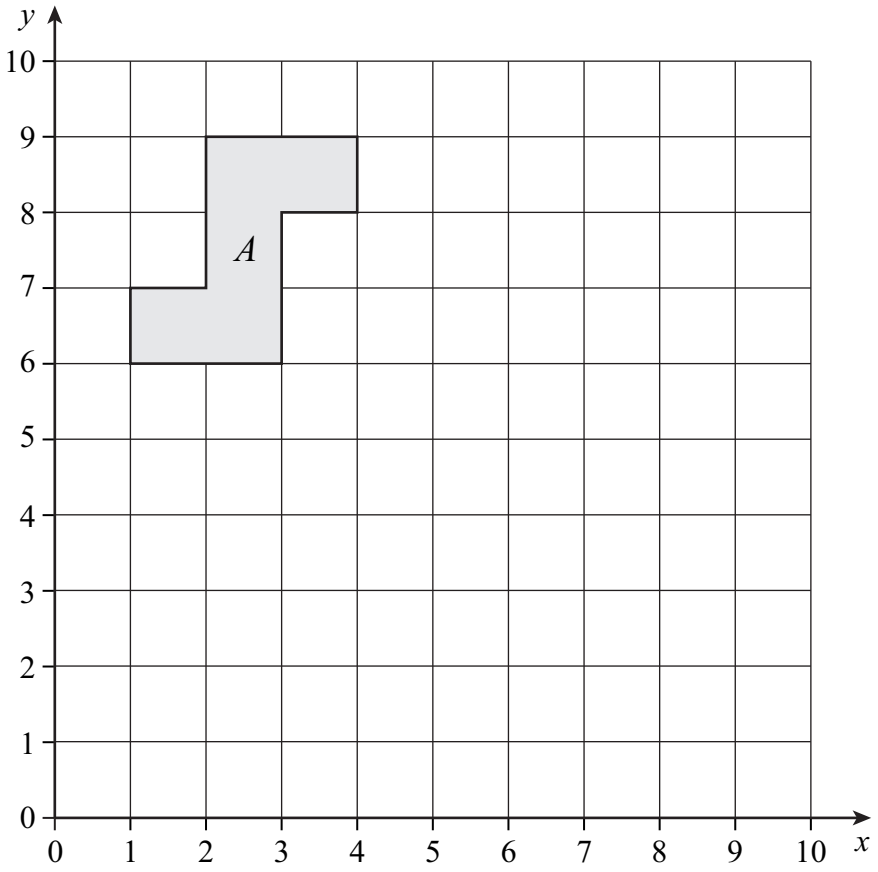
Answer ..... *(3 marks)*

12

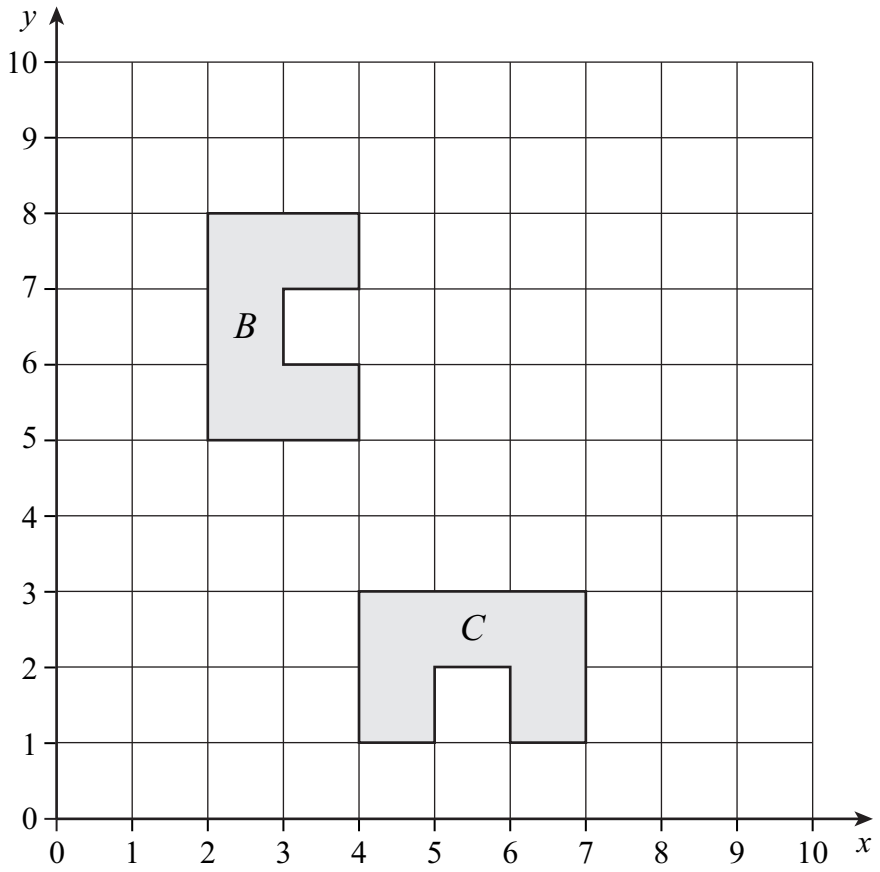
5 (a) The diagram shows shape *A*.



Reflect shape *A* in the line $y = 5$

(2 marks)

(b) The diagram shows two shapes *B* and *C*.



Describe fully the **single** transformation which takes shape *B* to shape *C*.

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(3 marks)

5

6 (a) I think of a number.
I multiply my number by 3 and add 1.
My answer is 22.

(i) Write down an equation to describe this.

.....

.....

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

(ii) What number am I thinking of?

.....

.....

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

(b) Solve the equation $4(3x + 1) = 88$

.....

.....

.....

Answer $x =$ ..... *(3 marks)*

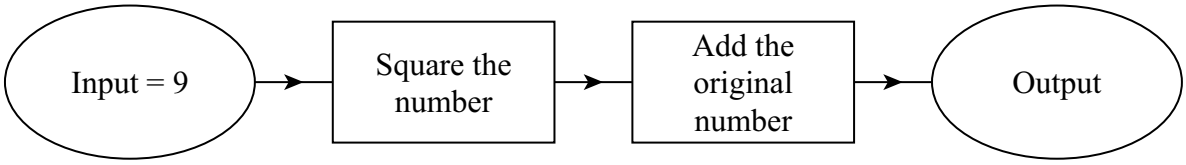
7 (a) Here is a number pattern.

$$10^2 + 10 = 10 \times 11$$
$$11^2 + 11 = 11 \times 12$$
$$12^2 + 12 = 12 \times 13$$

Write down the next line of the pattern.

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

(b) Look at the flow diagram.
The input is 9.



What is the output?

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

(c) The nth term of a sequence is $n(n + 1)$.

Write down the first three terms of the sequence.

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

(d) n is a positive integer.

Solve $n(n + 1) = 56$

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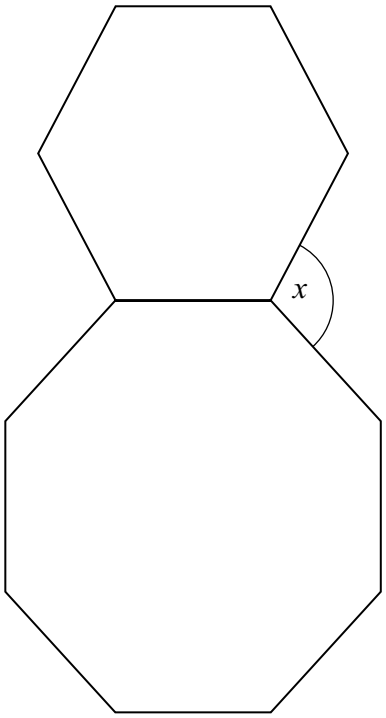
Answer n = ... *(3 marks)*

8 A regular hexagon and a regular octagon are joined together along a common side as shown.



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Find the size of angle x.

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Answer ..... degrees *(5 marks)*

9 (a) Work out the value of $4^3 \times 10^2$

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.....

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

(b) Simplify

(i) $a^3 \times a^4$

.....

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

(ii) $a^{10} \div a^2$

.....

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

(iii) $(a^5)^2$

.....

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

(c) (i) Put a circle around the expression which is greatest when $a = 10$

$a^3 \times a^4$ $a^{10} \div a^2$ $(a^5)^2$

(1 mark)

(ii) Put a circle around the expression which is negative when $a = -10$

$a^3 \times a^4$ $a^{10} \div a^2$ $(a^5)^2$

(1 mark)

12

10 (a) The graph of the line $x + y = 5$ meets the line $x = 1.5$ at the point P.

Find the coordinates of the point P.
You may use the graph paper to help you.

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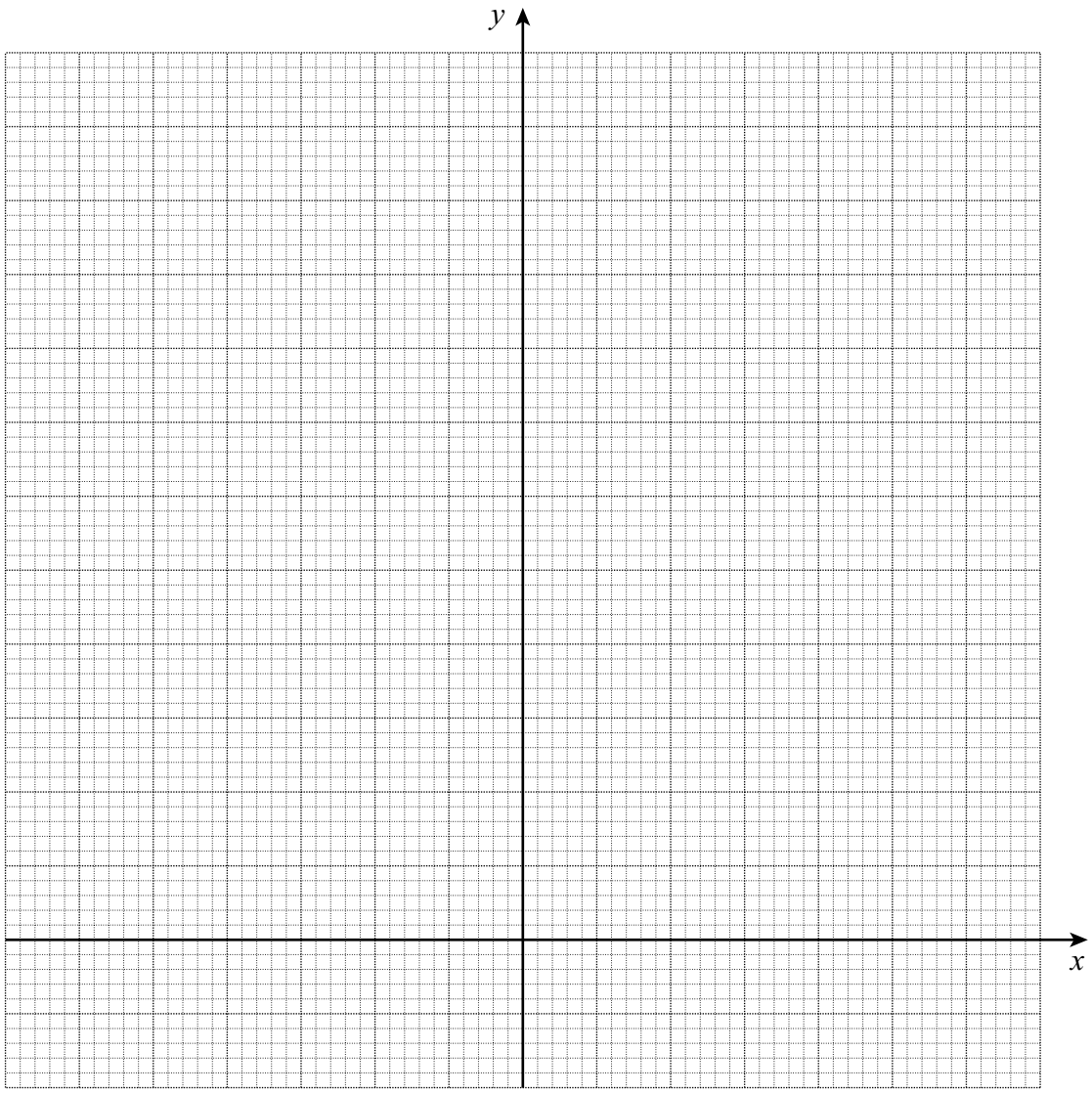
Answer (..... , ...) *(3 marks)*



(b) The graph of the line $x + y = 5$ meets the line $y = 2x + 8$ at the point Q.

Find the coordinates of the point Q.
You may use the graph paper to help you.

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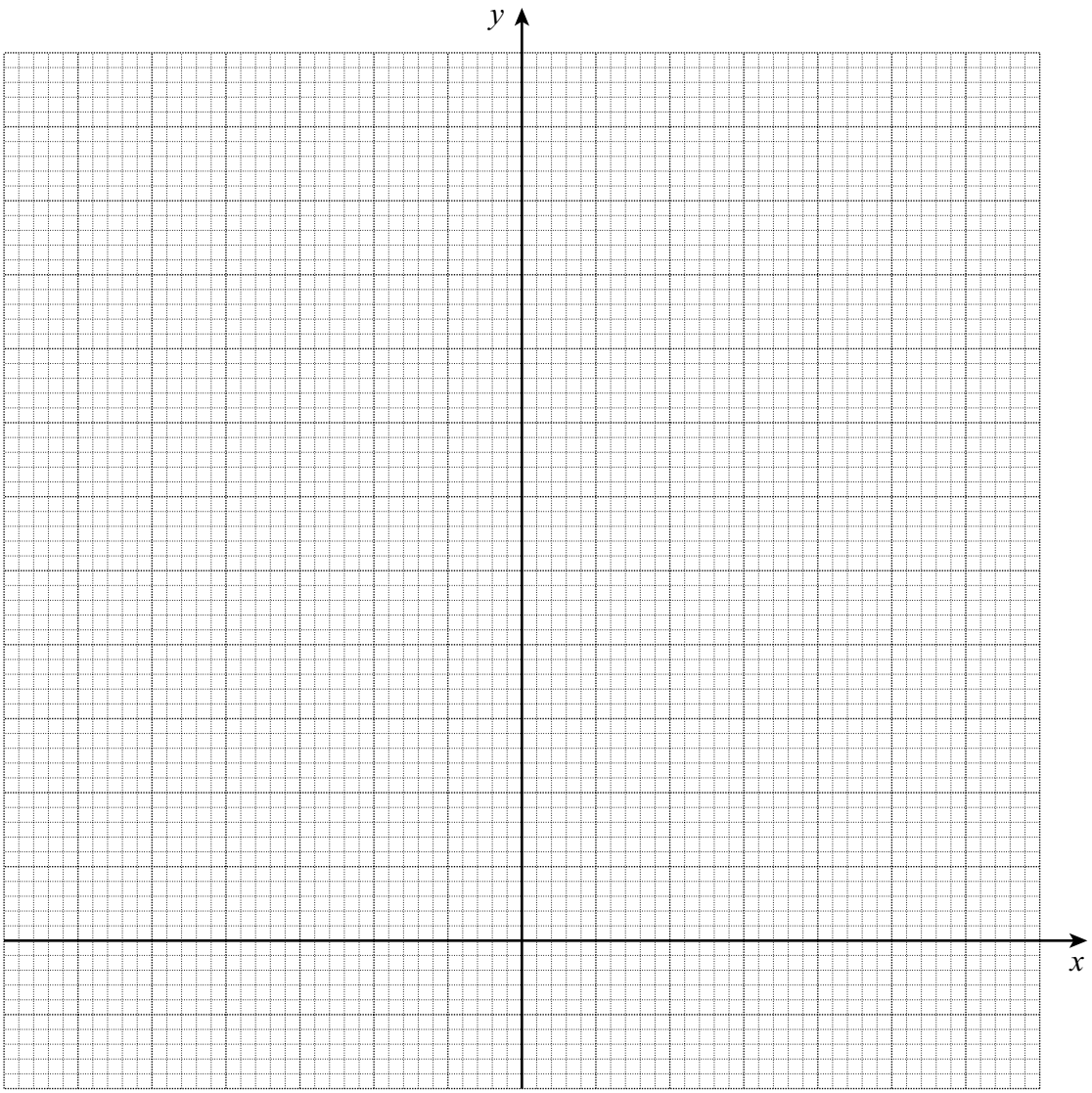
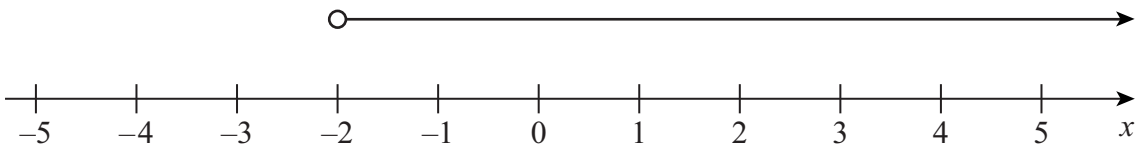
Answer (..... , ...) *(3 marks)*



6

11 (a) Write down the inequality shown by the following diagram.



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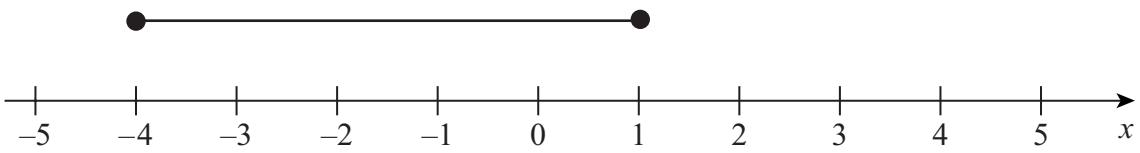
Answer ..... *(1 mark)*

(b) Write down the inequality shown by the following diagram.



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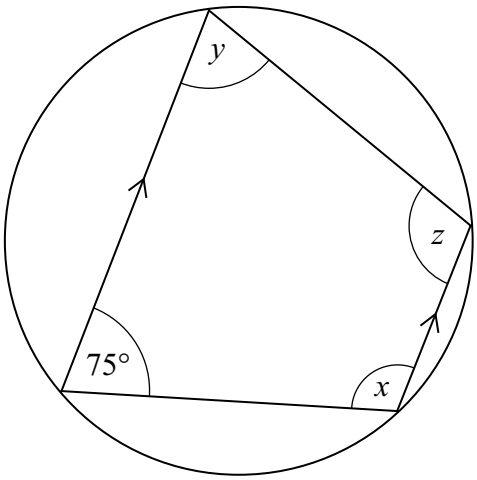
Answer ..... *(2 marks)*

(c) Write down **all** the integers that satisfy both inequalities shown in parts (a) and (b).

.....

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

12 The diagram shows a cyclic trapezium.



Not drawn accurately

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

Answer ..... degrees

Reason .....

.....

(2 marks)

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

Answer ..... degrees

Reason .....

.....

(2 marks)

(c) Work out the value of z.

.....

.....

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

9

13 x and y represent two numbers.
x is five more than y.
$3x + y = 29$

Use an algebraic method to work out the value of $2x - y$.
You **must** show your working.
Do **not** use trial and improvement.

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Answer ..... *(4 marks)*

END OF QUESTIONS

4

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