Surname		Other Names	
Centre Number			Candidate Number					
Candidate Signature									

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General Certificate of Secondary Education
November 2004

ASSESSMENT and QUALIFICATIONS ALLIANCE

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

Friday 5 November 2004 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.

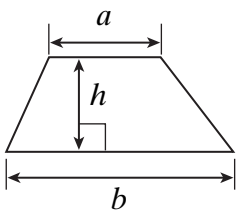
Advice
- In all calculations, show clearly how you work out your answer.

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

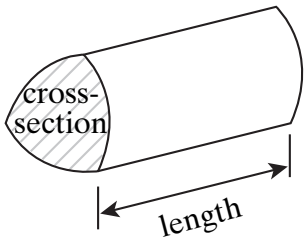
Formulae Sheet: Intermediate Tier

You may need to use the following formulae:

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



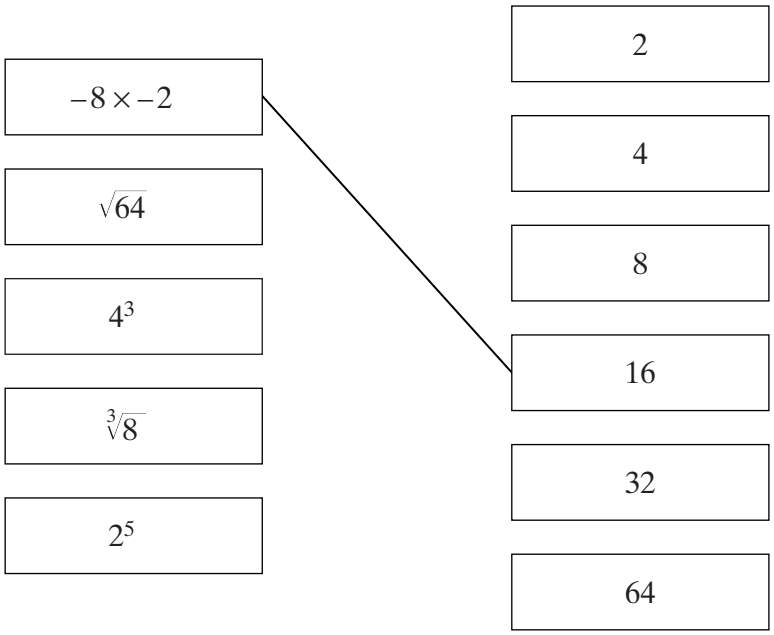
Volume of prism = area of cross-section × length



LEAVE MARGIN BLANK

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

1 Draw lines on the diagram to show which values are equal.
One line has been drawn for you.

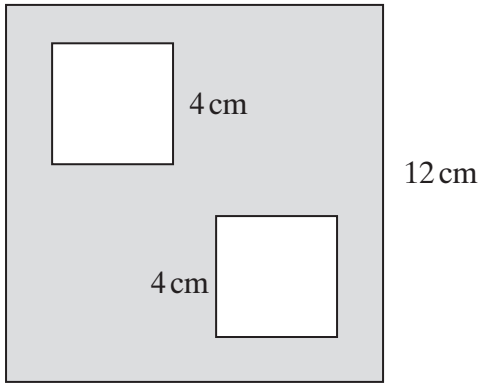


(3 marks)

TURN OVER FOR THE NEXT QUESTION

3

2 (a) Two squares of side 4 cm are removed from a square of side 12 cm as shown.



Not to scale

Work out the shaded area.

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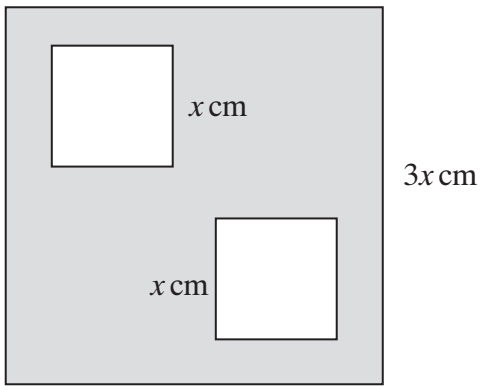
Answer ..... *(3 marks)*

(b) Two squares of side x cm are removed from a square of side $3x$ cm as shown.



Not to scale

Work out the fraction of the large square which remains.
Give your answer in its simplest form.

You **must** show your working.

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

6

3 If $x = 5$ and $y = -7$, find the value of

(a) $4x + 3y$

.....

.....

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

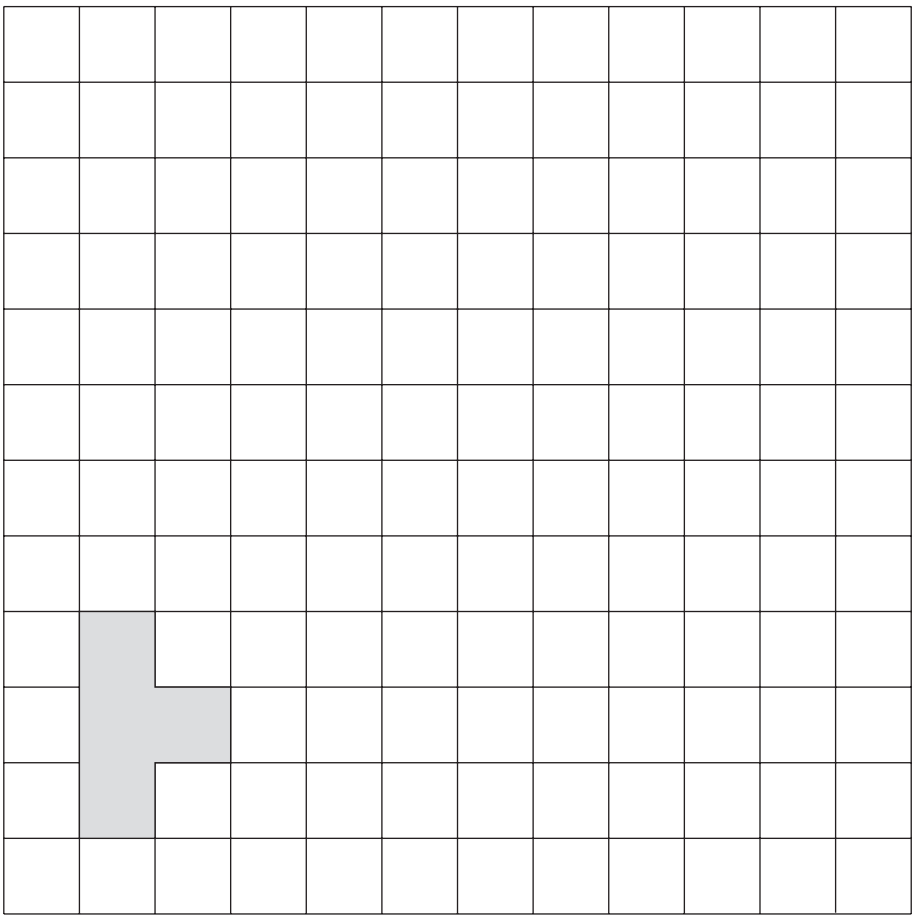
(b) $\frac{x - y}{4}$

.....

.....

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

4 (a) Enlarge the shaded shape by a scale factor of 3.



(2 marks)

(b) How many times bigger is the area of the enlarged shape than the area of the small shape?

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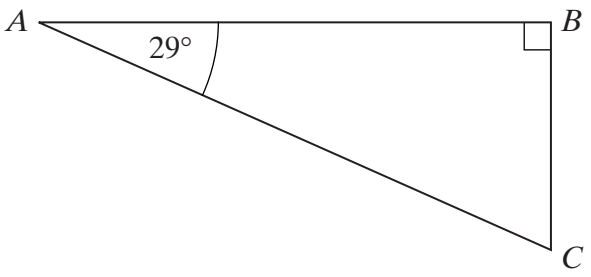
Answer ..... *(2 marks)*

8

5 (a) ABC is a right-angled triangle.
Angle $A = 29°$



Not drawn accurately

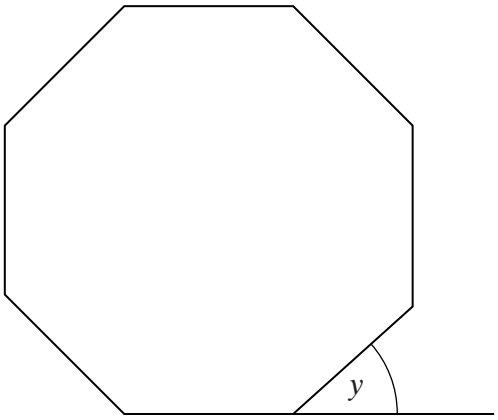
Work out the size of angle C.

.....

.....

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

(b) The diagram shows a regular octagon.



Not drawn accurately

Calculate the size of the exterior angle of the regular octagon, marked y on the diagram.

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.....

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

6 Solve the equations

(a) $4x + 7 = 3$

.....

.....

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

(b) $3y - 11 = 9 - y$

.....

.....

.....

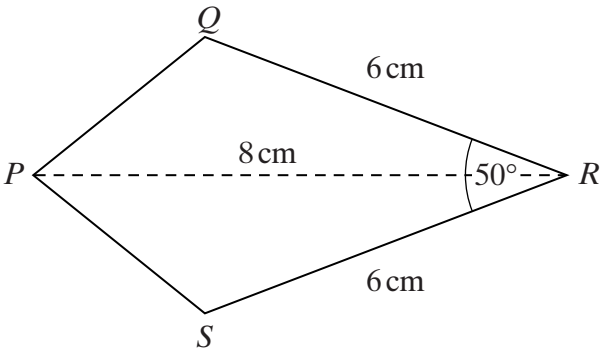
.....

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

TURN OVER FOR THE NEXT QUESTION

8

7 The kite *PQRS* is sketched below.
QR = *SR* = 6 cm
Angle *QRS* = 50°
The diagonal *PR* = 8 cm



Not to scale

Make an accurate drawing of the kite *PQRS*.

PR has been drawn for you.

P ---------- *R*

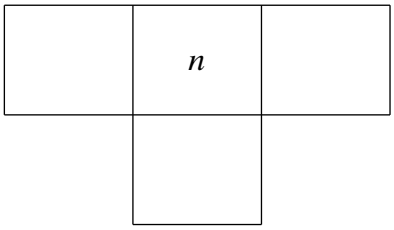
(3 marks)

8 Part of a number grid is shown below.

1	2	3	4	5	6	7	8
9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24
25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56

The shaded shape is called T_{11} because it has 11 in the middle of its top row.
The sum of the numbers in T_{11} is 52.

(a) This is T_n



Fill in the empty boxes of T_n

(2 marks)

(b) Find the sum of all the numbers in T_n in terms of n.
Give your answer in its simplest form.

.....

.....

.....

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

(c) Explain why the sum of all the numbers in T_n is always divisible by 4.

.....

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(2 marks)

9

9 Tara buys x rulers at 25 pence each and y biros at 70 pence each.

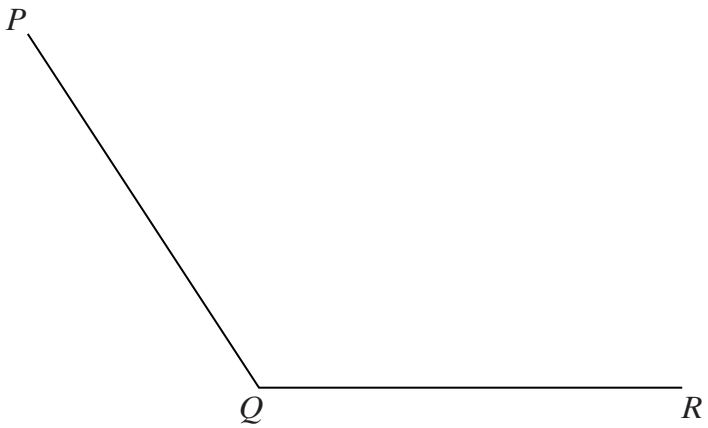
Write down an expression for the total cost of the rulers and biros.

.....

.....

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

10 Using ruler and compasses only, construct the bisector of angle PQR.



(2 marks)

11 In this question, the letters x, y and z represent lengths.

State whether each expression could represent a length, an area or a volume.

(a) xyz

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

(b) $\pi(x + y + z)$

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

12 Simplify

(a) $c \times c \times c \times c$

.....

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

(b) $d^3 \times d^2$

.....

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

(c) $\frac{e}{e^8}$

.....

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

(d) $(f^3)^2$

.....

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

(e) $(2g^2h^4) \times (3g^3h)$

.....

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

12

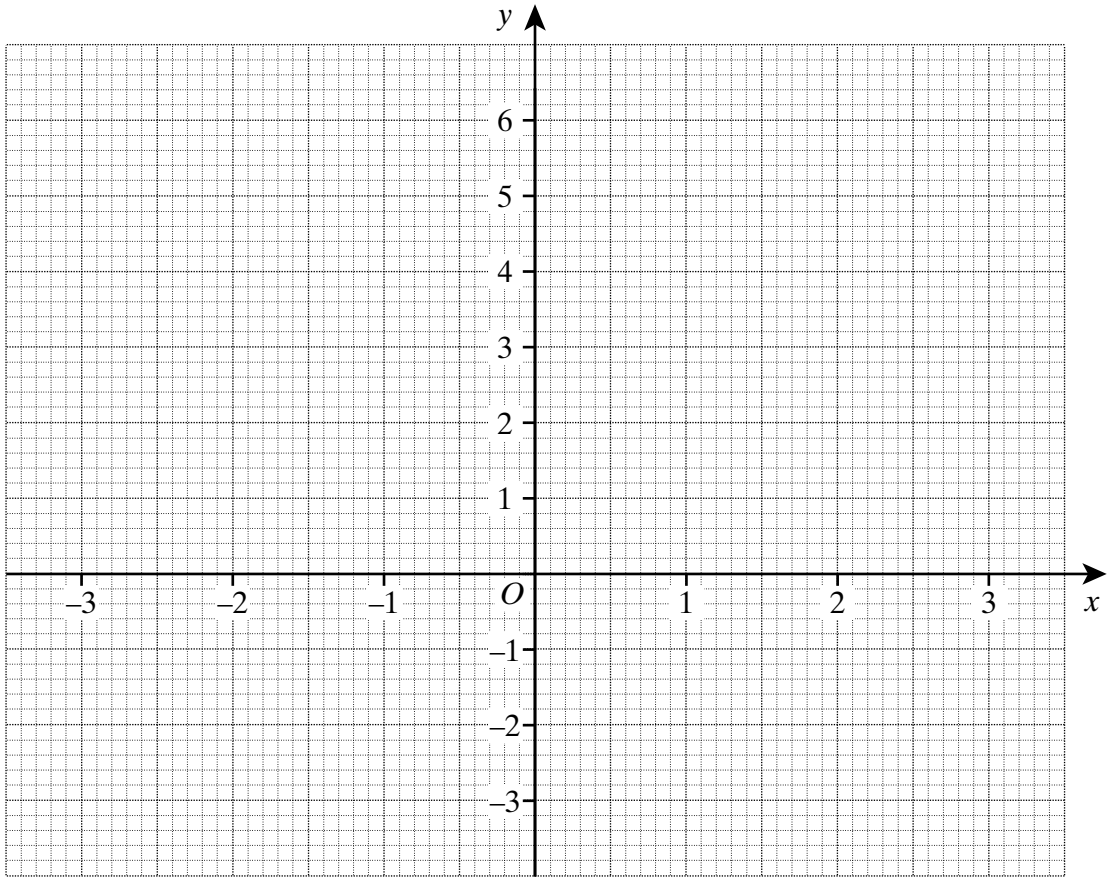
13 (a) Complete the table of values for $y = x^2 - 3$.

x	–3	–2	–1	0	1	2	3
y	6	1		–3	–2	1	6

.....

(1 mark)

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



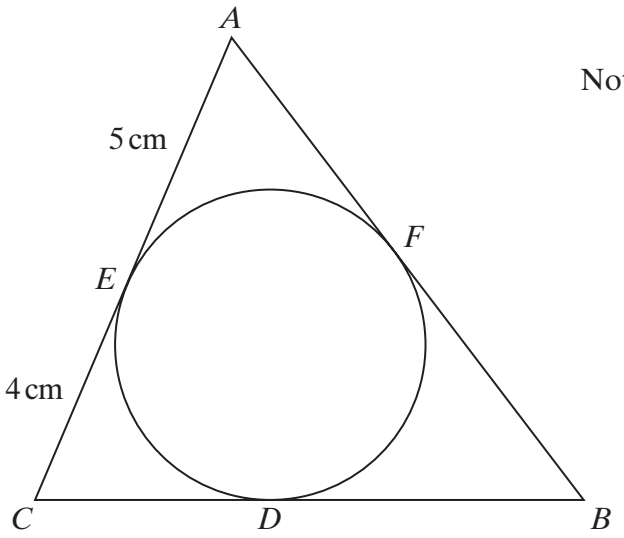
(2 marks)

(c) Write down the values of x at the points where the line $y = 2$ crosses your graph.

.....

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

14 In the diagram, the sides of triangle ABC are tangents to the circle.
D, E and F are the points of contact.
$AE = 5\,\text{cm}$ and $EC = 4\,\text{cm}$



Not to scale

(a) Write down the length of CD.

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

(b) The perimeter of the triangle is 32 cm.

Calculate the length of DB.

.....

.....

.....

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

8

15 Multiply out and simplify $(2p - 5q)(3p + q)$

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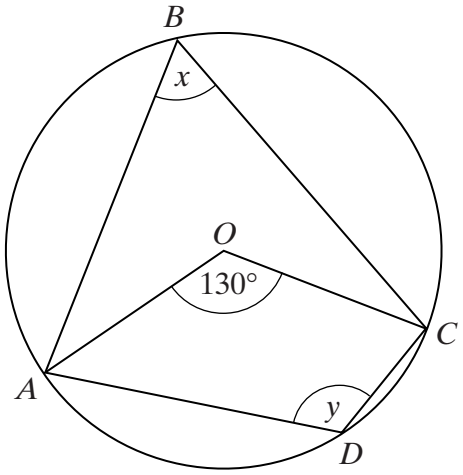
Answer ..... *(3 marks)*

16 In the diagram, O is the centre of the circle.
A, B, C and D are points on the circumference.
Angle $AOC = 130°$



Not drawn accurately

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

Answer x = ... degrees

Reason .....

.....

(2 marks)

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

Answer y = ... degrees

Reason .....

.....

(2 marks)

17 Here are the equations of four straight lines.

Line 1: $y = x + 4$

Line 2: $y = 3x$

Line 3: $y = 3x + 5$

Line 4: $y = -x + 5$

(a) Which two lines are parallel?

.....

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

(b) Which two lines intersect the y axis at the same point?

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

18 The sum of two numbers is 15.
The difference of the same two numbers is 3.

What is the product of the two numbers?
You **must** show your working.

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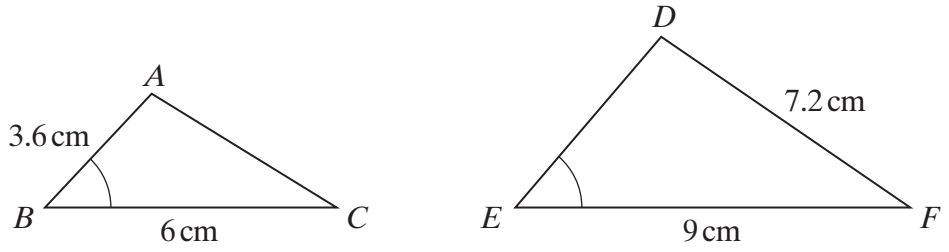
Answer ..... *(3 marks)*

12

19 Triangles ABC and DEF are similar.
Angle B = angle E
AB = 3.6 cm and BC = 6 cm
DF = 7.2 cm and EF = 9 cm



Diagrams not to scale

(a) Calculate the length of DE.

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

(b) Calculate the length of AC.

.....

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

END OF QUESTIONS

4

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THERE ARE NO QUESTIONS PRINTED ON THIS PAGE