Surname		Other Names	
Centre Number			Candidate Number									
Candidate Signature												

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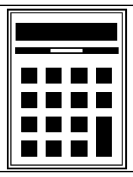
General Certificate of Secondary Education
June 2006

MATHEMATICS (MODULAR) (SPECIFICATION B) 33005/I2
Module 5 Intermediate Tier
Paper 2 Calculator

Monday 12 June 2006 9.00 am to 10.15 am

For this paper you must have:
- a calculator
- mathematical instruments



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.
- Use a calculator where appropriate.
- Do all rough work in this book.
- If your calculator does not have a π button, take the value of π to be 3.14 unless another value is given in the question.

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.

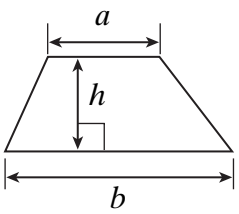
Advice
- In all calculations, show clearly how you work out your answer.

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	

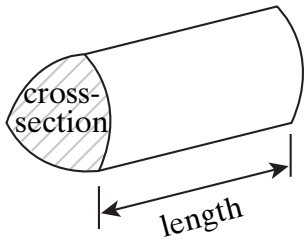
Formulae Sheet: Intermediate Tier

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



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

1 Calculate 36% of £420.

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Answer £ ..... *(2 marks)*

2 Jon lives 17 kilometres from Aqamart.
Kevin lives 11 miles from Aqamart.

Which of them lives closest to Aqamart?
You **must** show how you work out your answer.

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

Turn over for the next question

5

3 In triangle PQR, the side $PQ = 8$ cm
Angle $P = 70°$ and angle $Q = 50°$

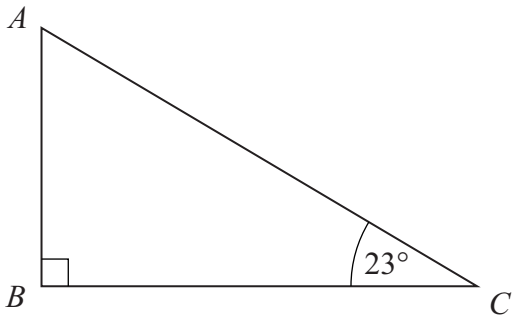
(a) Make an accurate drawing of the triangle.
The side PQ has been drawn for you.

(2 marks)

(b) Measure and write down the length of PR.

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

4 (a) In triangle *ABC*, angle *B* is a right angle.
Angle *C* = 23°



Not drawn accurately

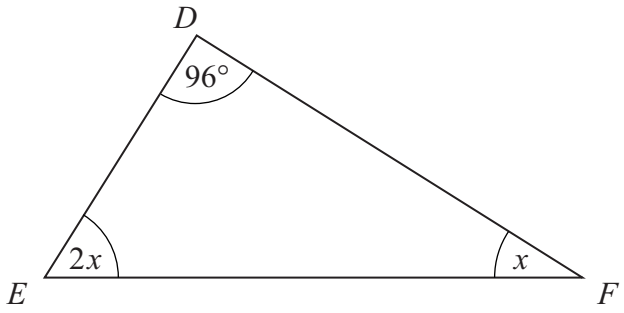
Work out the size of angle *A*.

.....

.....

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

(b) The angles in triangle *DEF* are 96°, 2*x* and *x*.



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Work out the value of *x*.

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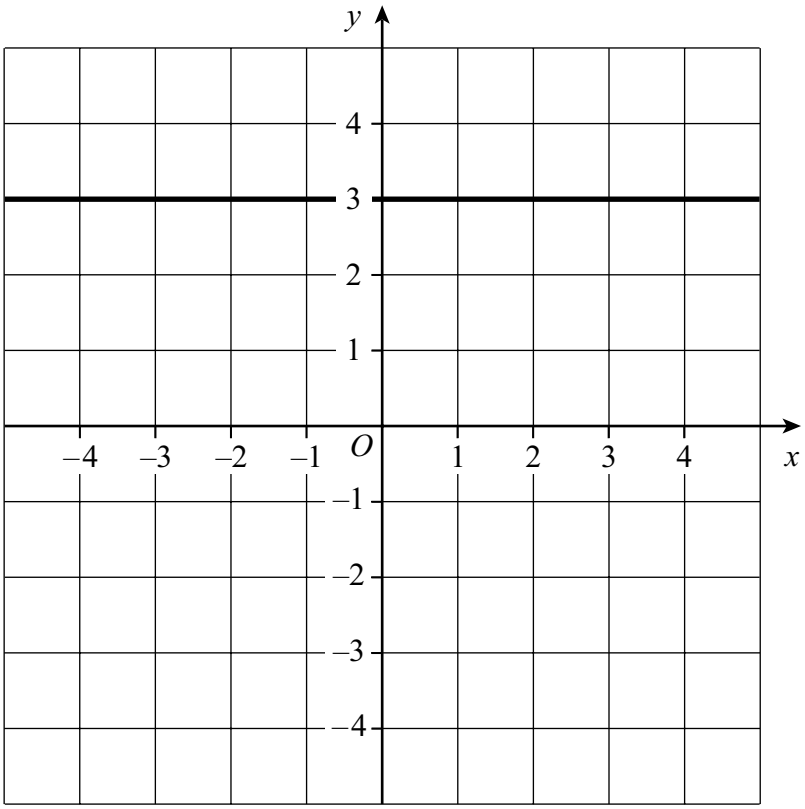
Answer ..... degrees *(3 marks)*

8

5



(a) Pam says the graph shows the line $x = 3$

Explain why Pam is wrong.

.....

.....

(1 mark)

(b) Find the equation of the line that goes through the points (2, 0) and (2, –3).

.....

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

6 (a) Find the value of $p^2 + 3q$ when $p = 7$ and $q = -4$

.....

.....

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

(b) Solve the equations

(i) $\frac{x}{5} = 2$

.....

Answer $x =$ ..... *(1 mark)*

(ii) $4y - 1 = 9$

.....

.....

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

(iii) $4(z + 3) = 8$

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.....

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

(iv) $3t + 4 = 19 - 2t$

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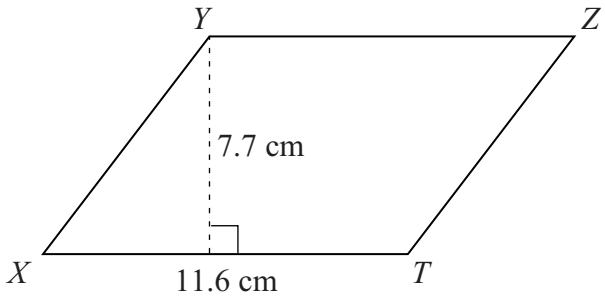
Answer $t =$ ..... *(3 marks)*

14

7 *XYZT* is a parallelogram.
The base $XT = 11.6$ cm and the perpendicular height is 7.7 cm.



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Calculate the area of the parallelogram.

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

8 The circumference of a circle measures 26.7 cm.

Work out the length of the diameter of the circle.

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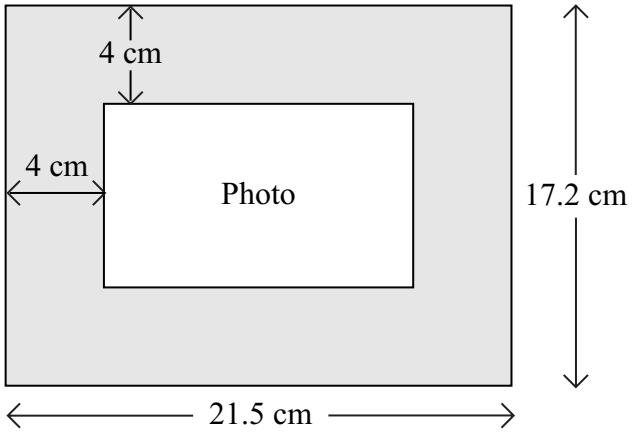
Answer ..... cm *(2 marks)*

9 A rectangular photo is surrounded by a frame which is 4 cm wide.
The outer measurements of the frame are 21.5 cm by 17.2 cm.



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Calculate the area of the frame.
This area is shaded in the diagram.

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Answer ..... cm^2 *(5 marks)*

9

10 Liam is using trial and improvement to find a solution to the equation

$$x^3 + 4x = 72$$

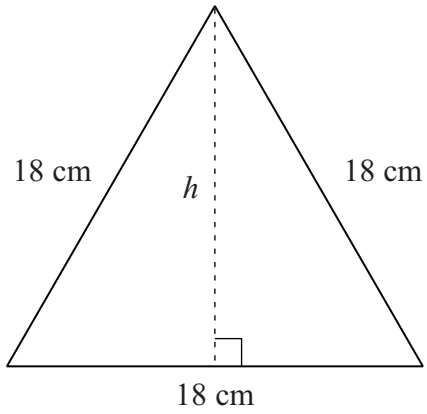
The table shows his first two trials.

x	$x^3 + 4x$	**Comment**
3	39	Too small
4	80	Too large

Continue the table to find a solution to the equation.
Give your answer to one decimal place.

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

11 The diagram shows an equilateral triangle of side 18 cm.



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Calculate the height of the triangle (marked *h* in the diagram).

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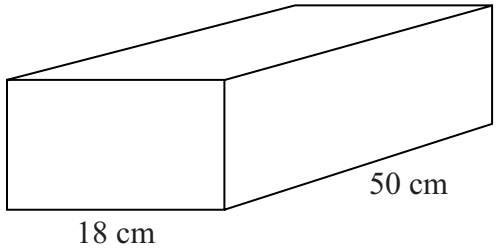
Answer ..... cm *(4 marks)*

Turn over for the next question

7

12 A wooden cuboid is 18 cm wide, 15 cm high and 50 cm long.
It weighs 12 kg.



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Calculate the density of the wood.
Give your answer in g/cm^3.

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Answer ..... g/cm^3 *(3 marks)*

13 (a) Solve the inequality $5x + 3 < 18$

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

(b) y is an integer.

Write down all the solutions of the inequality $-6 \leqslant 2y < 0$

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

Turn over for the next question

8

14 (a) Expand and simplify $(p + 7)(p + 2)$

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

(b) (i) Factorise $x^2 + x - 6$

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

(ii) Hence solve the equation $x^2 + x - 6 = 0$

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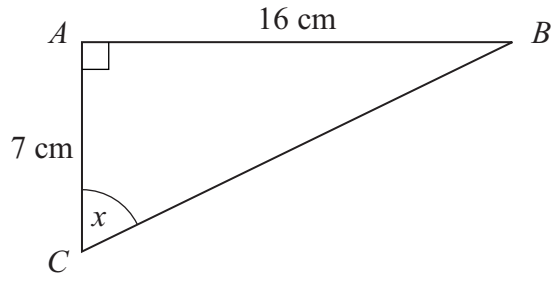
Answer ..... *(1 mark)*

15 (a) In triangle ABC, angle $A = 90°$, $AB = 16\,\text{cm}$ and $AC = 7\,\text{cm}$



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Calculate the value of x.

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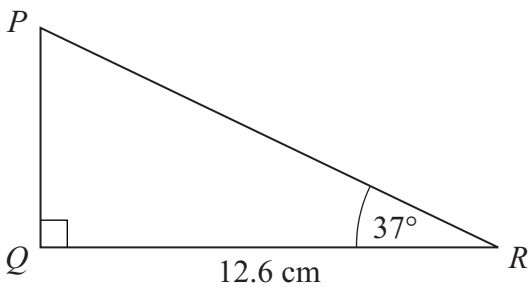
Answer ..... degrees *(3 marks)*

(b) In triangle PQR, angle $Q = 90°$, angle $R = 37°$ and $QR = 12.6\,\text{cm}$



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Calculate the length of PR.

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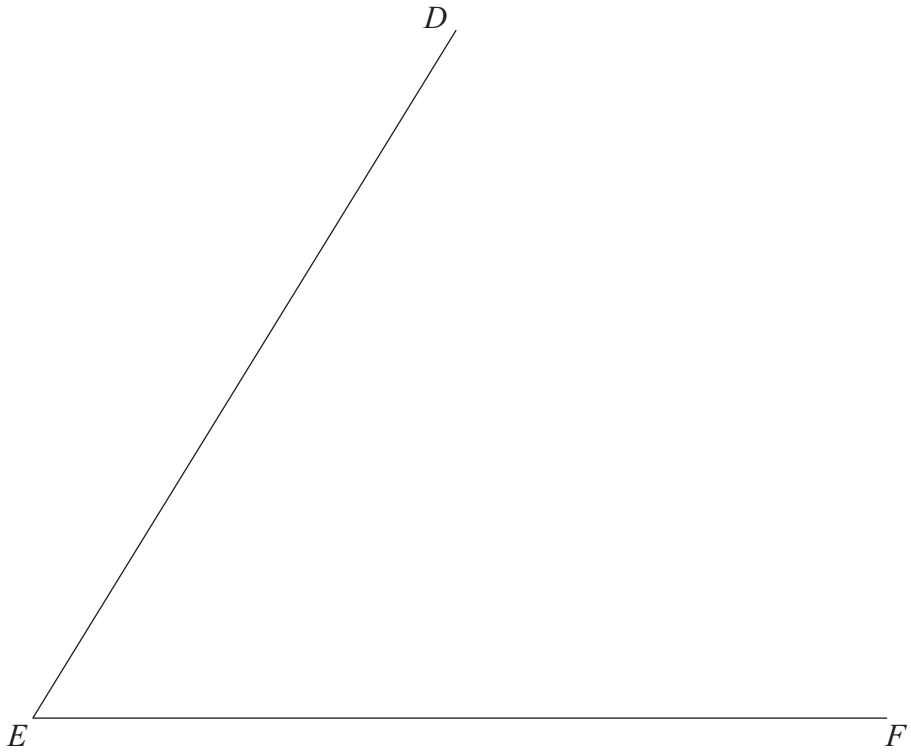
Answer ..... cm *(3 marks)*

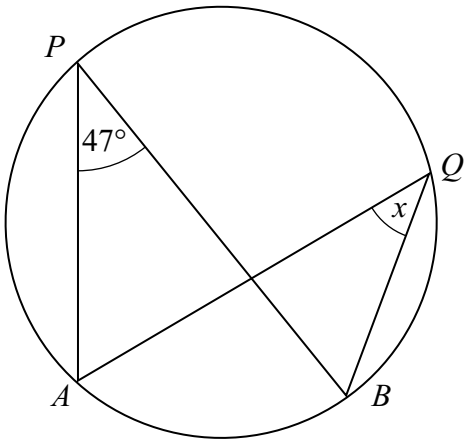
11

16 Using ruler and compasses only, construct the bisector of angle *DEF*.



(2 marks)

17 In the diagram, A, P, Q and B are points on the circumference of the circle.
Angle $APB = 47°$



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Find the value of x.
Give a reason for your answer.

Answer $x =$ ..... degrees

Reason .....

.....

(2 marks)

Turn over for the next question

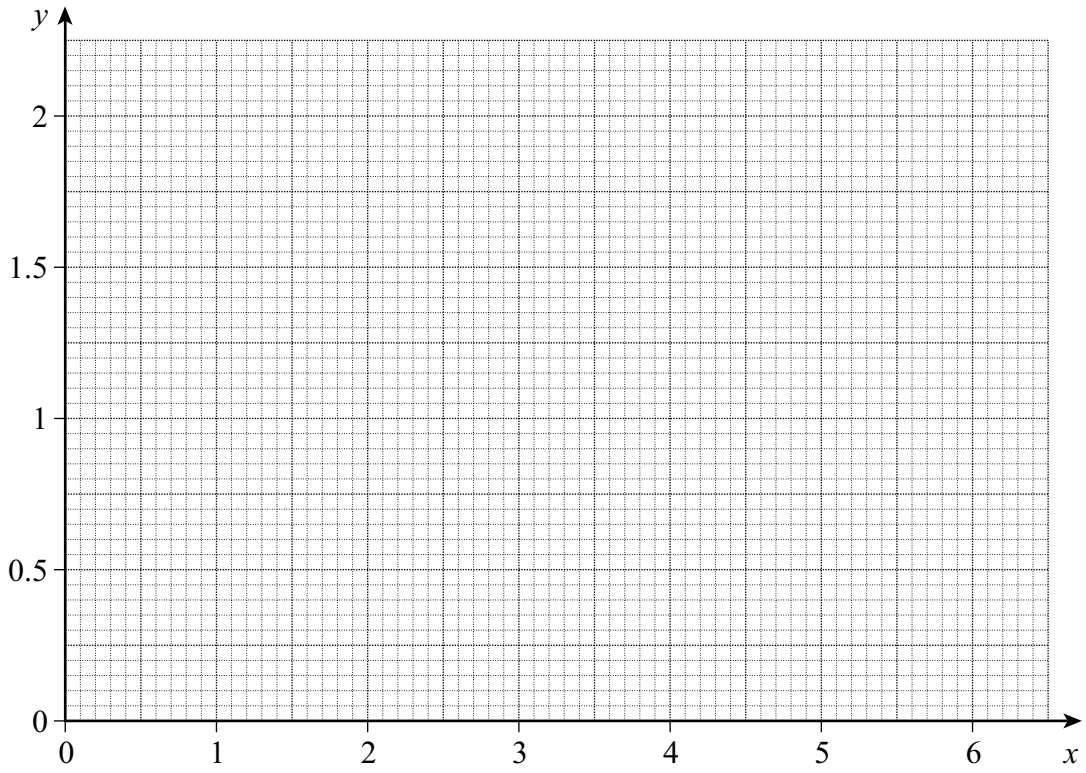
4

18 (a) Complete the table of values for $y = \frac{1}{x}$

x	0.5	1	2	3	4	5	6
y		1	0.5	0.33	0.25	0.2	0.17

(1 mark)

(b) On the grid, draw the graph of $y = \frac{1}{x}$ for values of x from 0.5 to 6.



(2 marks)

(c) Describe what happens to the graph for larger values of x.

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(1 mark)

END OF QUESTIONS

4

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