

Surname						Other Names					
Centre Number						Candidate Number					
Candidate Signature											

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General Certificate of Secondary Education
November 2006



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

33005/I2

Friday 10 November 2006 9.00 am to 10.15 am

<p>For this paper you must have:</p> <ul style="list-style-type: none"> • a calculator • mathematical instruments 	
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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

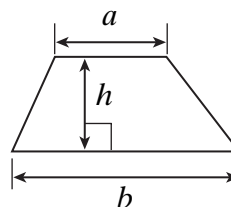
- In all calculations, show clearly how you work out your answer.

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

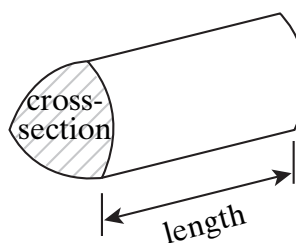
Formulae Sheet: Intermediate Tier

You may need to use the following formulae:

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

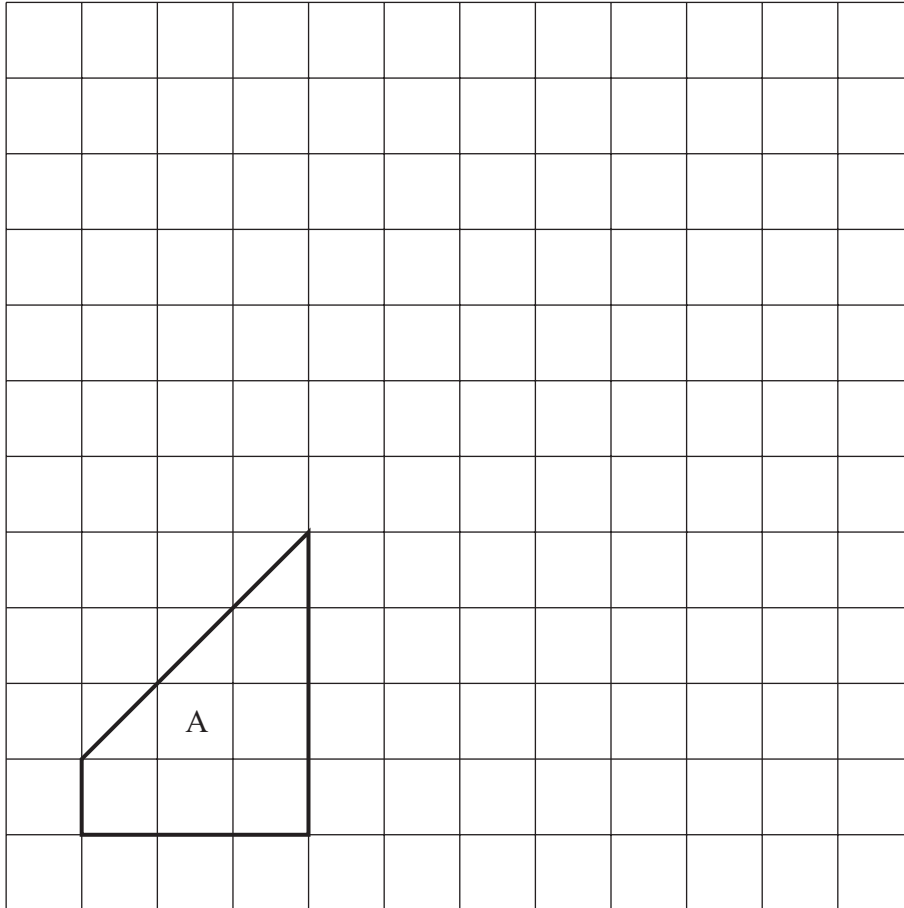


Volume of prism = area of cross-section \times length



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

- 1 (a) Enlarge shape A by a scale factor of 2.
Label your new shape B.



(2 marks)

- (b) Put a tick in the box beside the statements that are true.

Shape B is congruent to shape A.

☐

The angles of shape B are the same as the angles of shape A.

☐

The perimeter of shape B is twice the perimeter of shape A.

☐

The area of shape B is twice the area of shape A.

☐

(2 marks)

Turn over ►

2 If $p = 4$ and $q = -9$ find the value of

(a) $5p - 2q$

.....

.....

Answer (2 marks)

(b) $3pq$

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.....

Answer (2 marks)

3 (a) Work out $\frac{1}{1.25}$

Answer (1 mark)

(b) Work out the positive square root of 6.76

Answer (1 mark)

4 You are given that 1 foot = 12 inches

Ellie's height is 5 feet 6 inches.

Marie is her French pen-friend.

Marie's height is 172 centimetres.

Marie says, "I am taller than Ellie."

Is she correct?

You **must** show your working.

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(3 marks)

- 5 The shorter side of a parallelogram is 5.7 cm
The perimeter of the parallelogram is 34.6 cm



Not drawn accurately

Calculate the length of the longer side of the parallelogram.

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Answer cm (3 marks)

- 6 (a) Factorise $5x - 10$

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Answer (1 mark)

- (b) Factorise $y^2 + 3y$

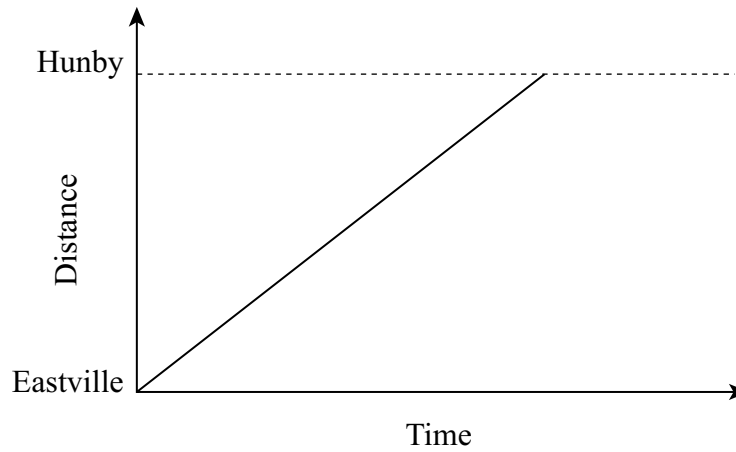
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Answer (1 mark)

7 This is part of a train timetable.

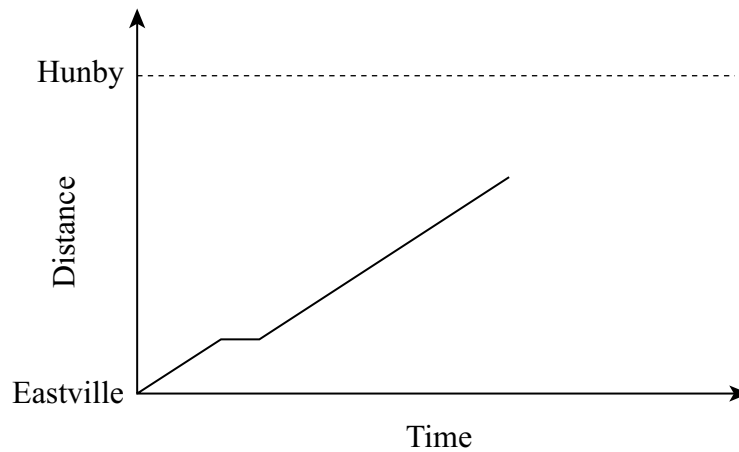
Train		A	B	C	D
Eastville	<i>depart</i>	0915	0948	1021	1054
Fraize	<i>arrive</i>	0927	1000	↓	<u>1109</u>
	<i>depart</i>	0930	1003		
Gamstone	<i>arrive</i>	1025	<u>1058</u>	↓	
	<i>depart</i>	1028			
Hunby	<i>arrive</i>	<u>1055</u>		<u>1140</u>	

(a) Which train, A, B, C or D, is shown in this distance-time graph?



Answer (1 mark)

(b) Which train is shown in this distance-time graph?

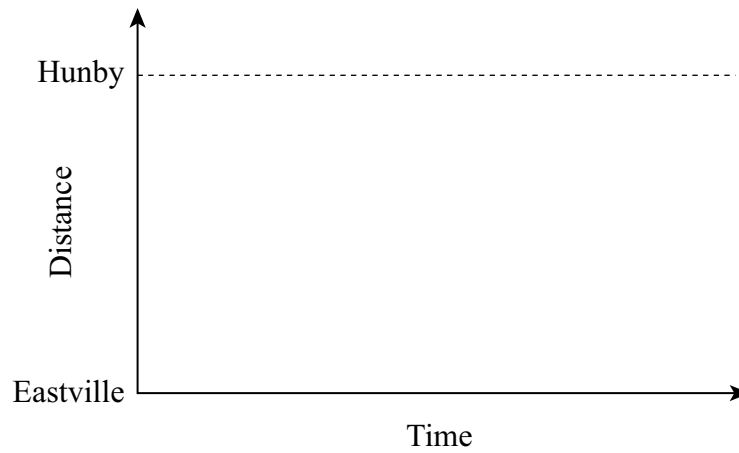


Answer (1 mark)

(c) Here is the timetable for the next train.

Train		E
Eastville	<i>depart</i>	1135
Fraize	<i>arrive</i>	1147
	<i>depart</i>	1150
Gamstone	<i>arrive</i>	↓
	<i>depart</i>	
Hunby	<i>arrive</i>	<u>1310</u>

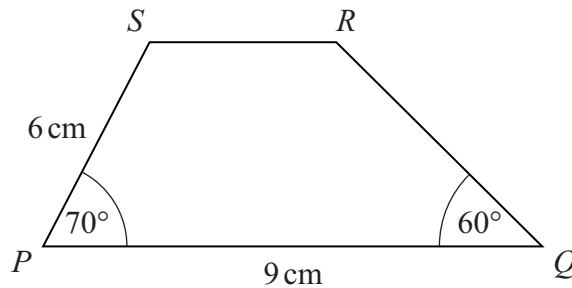
Sketch the distance-time graph for train E on the axes below.



(2 marks)

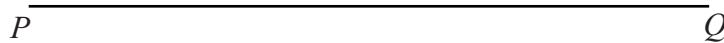
Turn over for the next question

- 8 The sketch shows a trapezium $PQRS$.
 SR is parallel to PQ .
 The base $PQ = 9$ cm
 Angle $P = 70^\circ$
 $PS = 6$ cm
 Angle $Q = 60^\circ$



Not drawn accurately

- (a) Make an accurate drawing of the trapezium.
 The base PQ has been drawn for you.



(4 marks)

- (b) Use your accurate drawing to measure and write down the length of SR .

Answer cm (1 mark)

9 Solve these equations.

(a) $\frac{x}{5} = 15$

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Answer $x =$ (1 mark)

(b) $\frac{1}{2}(y - 4) = 5$

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Answer $y =$ (3 marks)

(c) $7z + 2 = 5z - 4$

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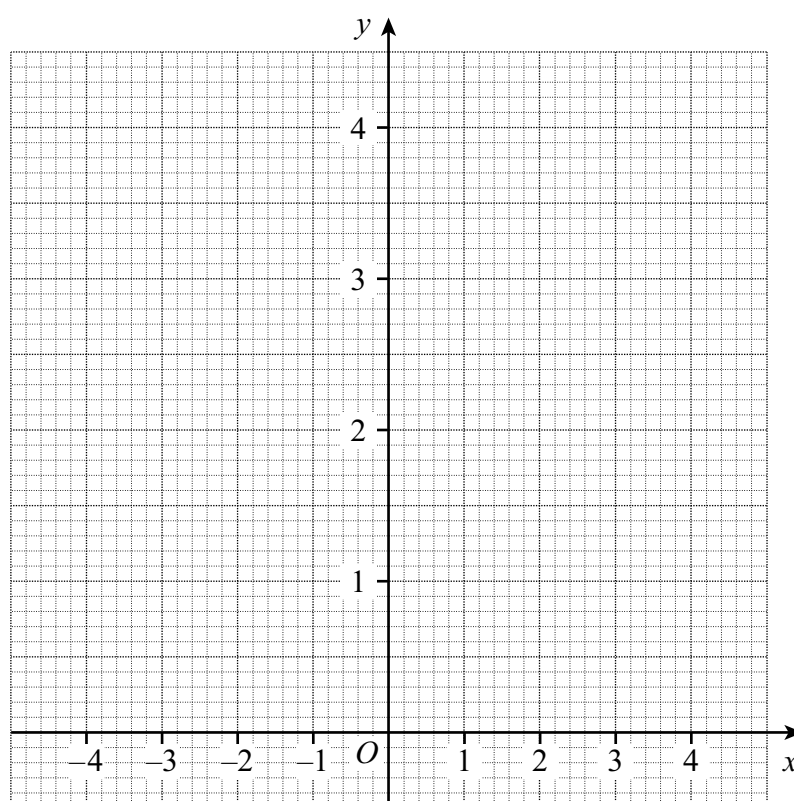
Answer $z =$ (3 marks)

Turn over for the next question

10 This is a table of values for $y = 4 - \frac{1}{5}x^2$

x	-4	-3	-2	-1	0	1	2
y	0.8	2.2	3.2	3.8	4	3.8	3.2

(a) Use the table to draw the graph of $y = 4 - \frac{1}{5}x^2$ for values of x from -4 to +2.



(2 marks)

(b) Use symmetry to write down the values of y when $x = 3$ and $x = 4$

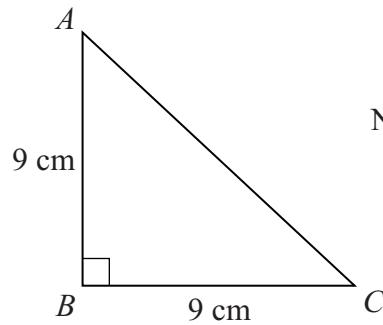
x	3	4
y		

(2 marks)

(c) Continue the graph to the point where $x = 4$

(1 mark)

- 11 (a) The diagram shows a right-angled isosceles triangle ABC .
 $AB = BC = 9 \text{ cm}$
 Angle $B = 90^\circ$



Not drawn accurately

Calculate the length of AC .
 Show your working.

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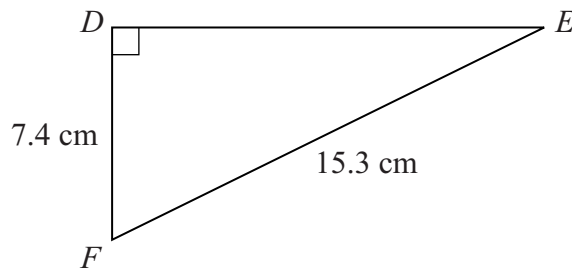
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Answer cm (3 marks)

- (b) In triangle DEF , angle $D = 90^\circ$
 $DF = 7.4 \text{ cm}$ and $FE = 15.3 \text{ cm}$



Not drawn accurately

Calculate the size of angle F .

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Answer degrees (3 marks)

12 Three points, A , B and C are shown below.



- (a) Use ruler and compasses to construct the perpendicular bisector of AB .
You **must** show clearly all your construction arcs.

(2 marks)

- (b) Shade in the area that is less than 3 cm from C and nearer to A than to B .

(2 marks)

- 13** Sam measures the width of his room as 2.8 metres to the nearest 10 centimetres.

What is the least possible width of the room?
Give your answer in centimetres.

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Answer cm (2 marks)

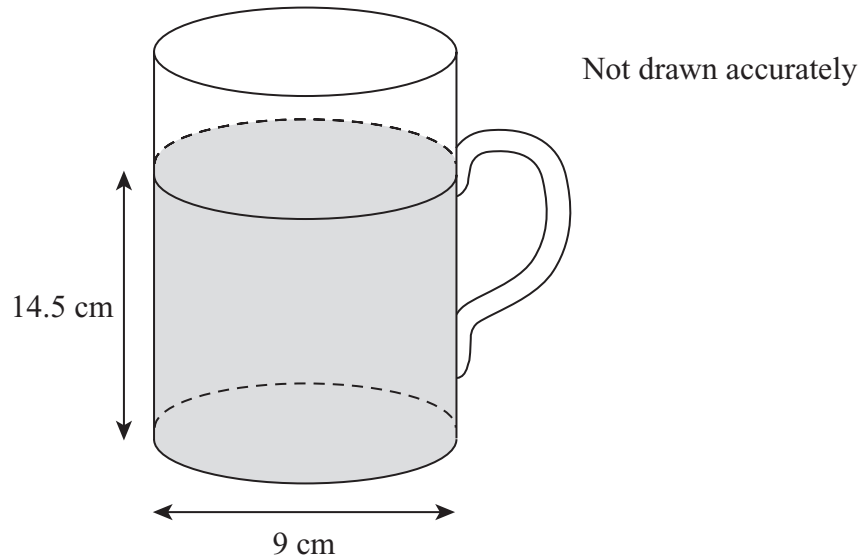
- 14** A solution of the equation $2x^3 + x = 40$ lies between $x = 2$ and $x = 3$

Use trial and improvement to find this solution.
Give your answer to one decimal place.

x	x^3	$2x^3$	$2x^3 + x$	Comment
2	8	16	18	too small

Answer $x =$ (4 marks)

- 15** The diagram shows a cylindrical coffee pot.
The diameter is 9 cm.
The coffee pot can safely be filled up to a height of 14.5 cm.



Will this coffee pot safely hold 1 litre of coffee?
(1 litre = 1000 cm³)
You **must** show your working.

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(4 marks)

- 16 (a) Expand and simplify $2(4y - 5) - 3(y + 2)$

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Answer (2 marks)

- (b) Expand and simplify $(p + 5)(p - 5)$

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Answer (2 marks)

- (c) Factorise $q^2 + 2q - 35$

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Answer (2 marks)

- (d) Make x the subject of the formula $r = \frac{1}{2}x - 5$

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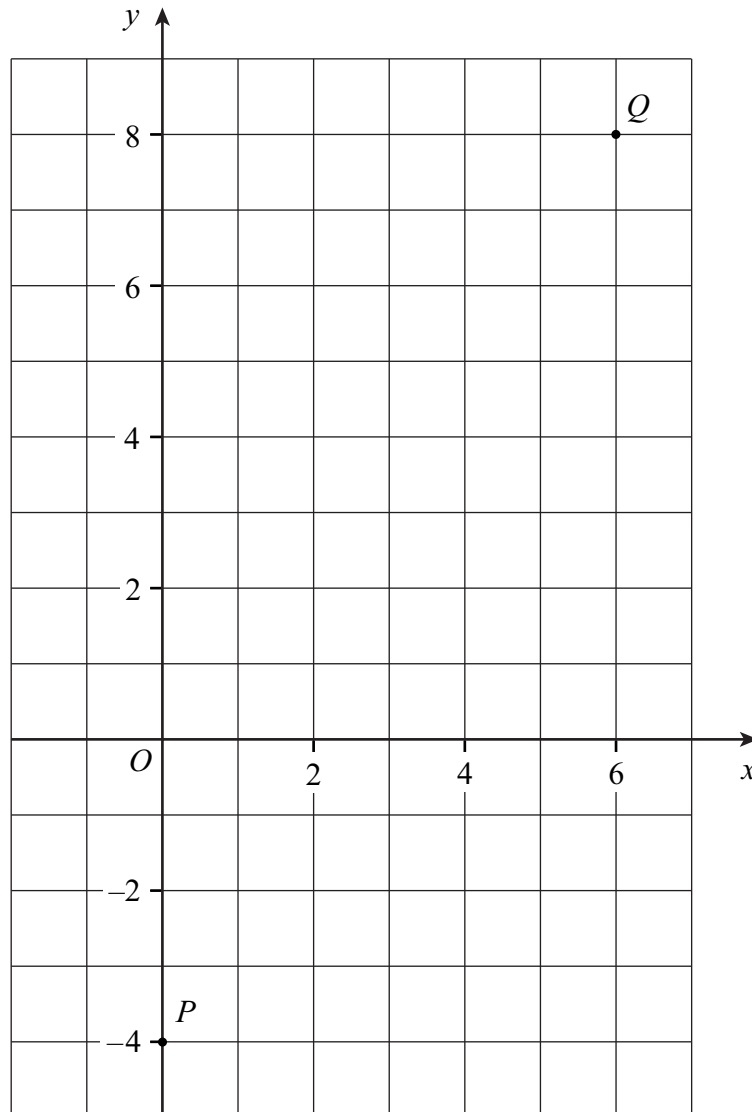
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Answer $x =$ (2 marks)

Turn over for the next question

- 17 The diagram shows the points $P(0, -4)$ and $Q(6, 8)$.



Find the equation of the line PQ .

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Answer $y = \dots\dots\dots$ (3 marks)

END OF QUESTIONS