

Surname						Other Names					
Centre Number						Candidate Number					
Candidate Signature											

For Examiner's Use
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General Certificate of Secondary Education  
June 2007



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

**33005/I2**

Monday 11 June 2007 9.00 am to 10.15 am

<p><b>For this paper you must have:</b></p> <ul style="list-style-type: none"> <li>• a calculator</li> <li>• mathematical instruments.</li> </ul>	
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For Examiner's Use	
Pages	Mark
3	
4–5	
6–7	
8–9	
10–11	
12–13	
14–15	
16	
TOTAL	
Examiner's Initials	

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  $\pi$  button, take the value of  $\pi$  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**

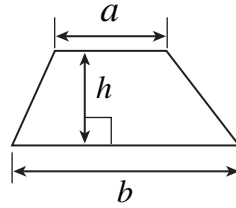
- In all calculations, show clearly how you work out your answer.

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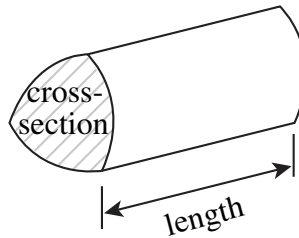
**Formulae Sheet: Intermediate Tier**

You may need to use the following formulae:

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

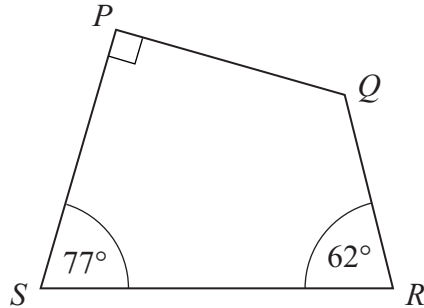


**Volume of prism** = area of cross-section  $\times$  length



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

- 1 (a)  $PQRS$  is a quadrilateral with a right angle at  $P$ .  
Angle  $S = 77^\circ$  and angle  $R = 62^\circ$



Not drawn accurately

Find the size of angle  $Q$ .

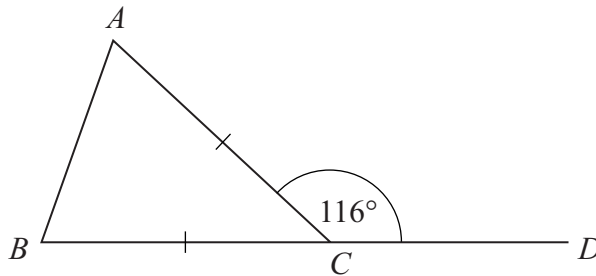
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Answer ..... degrees (2 marks)

- (b)  $ABC$  is an isosceles triangle with  $AC = BC$   
The side  $BC$  is extended to  $D$ .  
Angle  $ACD = 116^\circ$



Not drawn accurately

Find the size of angle  $A$ .

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Answer ..... degrees (3 marks)

Turn over ►

2 Here is a number pattern.

Line 1  $1 = \frac{1 \times 2}{2}$

Line 2  $1 + 2 = \frac{2 \times 3}{2}$

Line 3  $1 + 2 + 3 = \frac{3 \times 4}{2}$

Line 4  $1 + 2 + 3 + 4 = \frac{4 \times 5}{2}$

Line 5  $1 + 2 + 3 + 4 + 5 = \dots\dots\dots$

Line 6  $\dots\dots\dots = \dots\dots\dots$

(a) Complete line 5 of the pattern.

(1 mark)

(b) Write down line 6 of the pattern.

(1 mark)

(c) Use the pattern to find the sum of the whole numbers from 1 to 24.  
You **must** show your working.

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Answer ..... (2 marks)

- 3 1 ounce = 28.33 grams  
Nikki says that 16 ounces is less than half a kilogram.

Is she correct?  
You **must** show your working.

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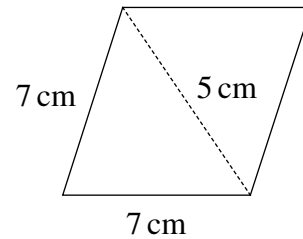
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(3 marks)

- 4 The side of a rhombus is 7 cm.  
The length of the shorter diagonal is 5 cm.

Make an accurate drawing of the rhombus.  
One side has been drawn for you.



Not drawn accurately



(4 marks)

Turn over ►

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

(a)  $5x + 3y$

.....  
.....  
.....

Answer ..... (2 marks)

(b)  $x^2 + y^2$

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.....

Answer ..... (2 marks)

(c)  $\frac{y + 8}{x}$

.....  
.....  
.....

Answer ..... (2 marks)

6 Dean picks three numbers.  
His first number is  $y$ .  
His second number is five more than his first number.

(a) Write down his second number in terms of  $y$ .

Answer ..... (1 mark)

(b) His third number is double his first number.

Write down his third number in terms of  $y$ .

Answer ..... (1 mark)

(c) Write down an expression for the sum of the three numbers.

Answer ..... (1 mark)

(d) The sum of the three numbers is 77.

Form an equation and solve it to find the value of  $y$ .

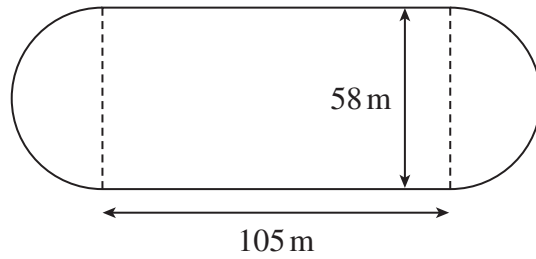
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Answer  $y =$  ..... (3 marks)

**Turn over for the next question**

Turn over ►

7 The diagram shows a running track, made up of a rectangle plus two semicircles.



Not drawn accurately

(a) Joel runs once round the perimeter of the track.

How far does he run?

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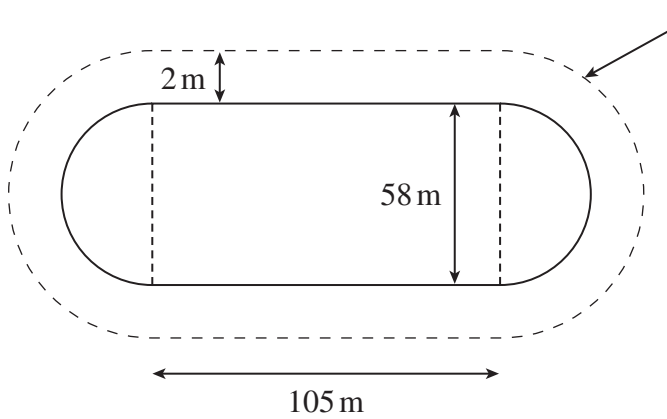
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Answer ..... m (4 marks)

(b) Tom runs on a line 2 metres outside the perimeter, as shown below.



Not drawn accurately

Tom runs once round this line.

How much further does he run than Joel?

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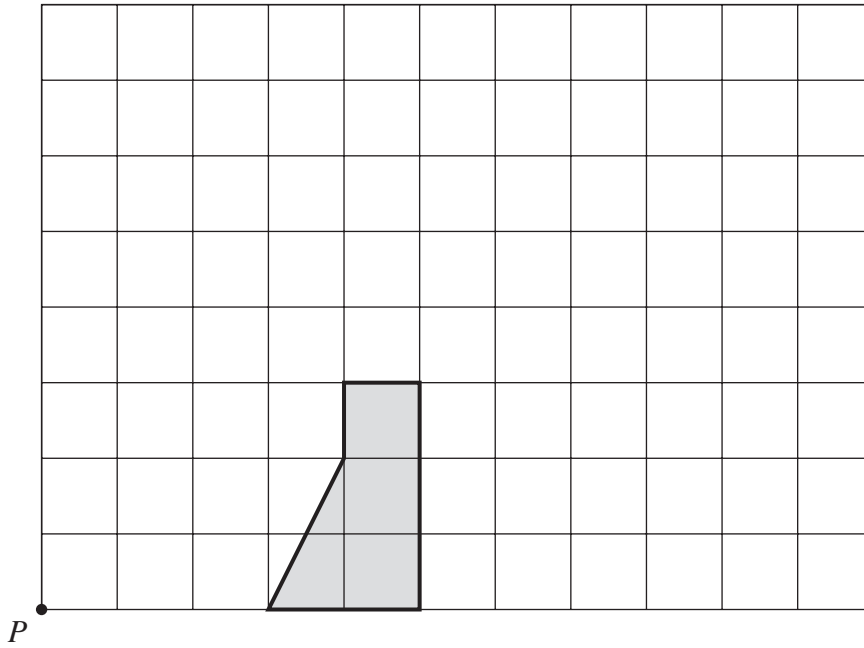
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Answer ..... m (3 marks)



- 8 Enlarge the shaded shape by scale factor 2, using the point  $P$  as the centre of enlargement.



(3 marks)

**Turn over for the next question**

Turn over ►

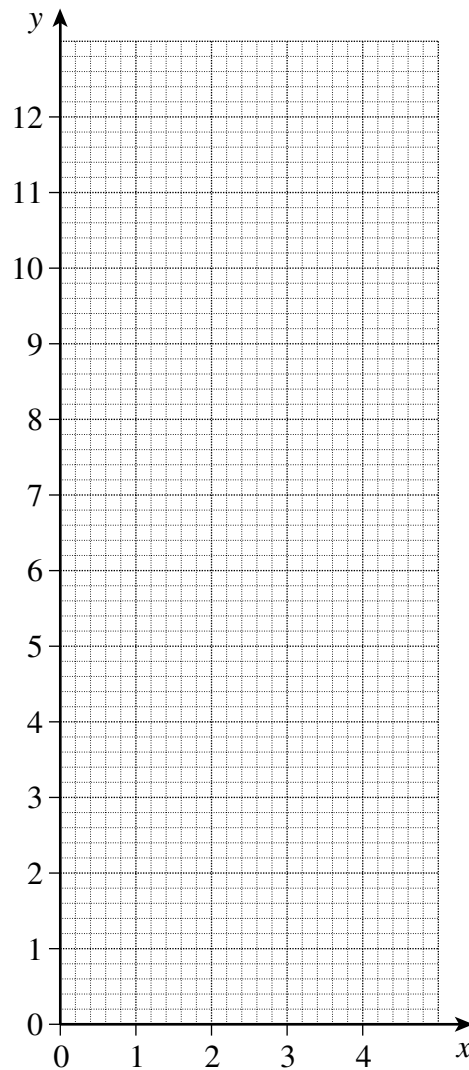
- 9 (a) Complete the table of values for  $y = 8 - 2x$

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$x$	0	2	4
$y$			0

(1 mark)

- (b) Draw the graph of  $y = 8 - 2x$  for values of  $x$  from 0 to 4.



(2 marks)

- (c) On the same grid, draw the graph of  $y = 3x$

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(2 marks)

- (d) Write down the coordinates of the point where the two graphs cross.

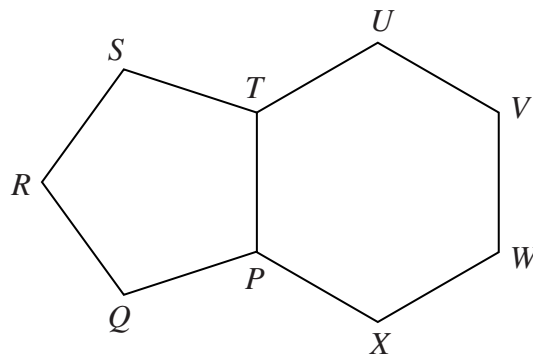
Answer ( ..... , ..... ) (1 mark)

10 (a) Calculate the size of the interior angle of a regular pentagon.

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 .....  
 .....

Answer ..... degrees (2 marks)

(b)  $PQRST$  is a regular pentagon.  
 $TUVWXP$  is a regular hexagon.



Not drawn  
accurately

Explain why the obtuse angle  $QPX = 132^\circ$

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 .....  
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(3 marks)

**11** Kerry is using trial and improvement to find a solution to the equation

$$8x - x^3 = 5$$

Her first two trials are shown in the table.

$x$	$8x - x^3$	Comment
2	8	too high
3	-3	too low

Continue the table to find a solution to the equation.

Give your answer to one decimal place.

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

**12 Simplify**

(a)  $x^4 \times x^2$

.....

Answer ..... (1 mark)

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

.....

Answer ..... (1 mark)

(c)  $4(2t + 1) - 3(t - 3)$

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Answer ..... (2 marks)

**Turn over for the next question****Turn over ►**

13 (a) Make  $x$  the subject of the formula  $C = 5x + 3y$

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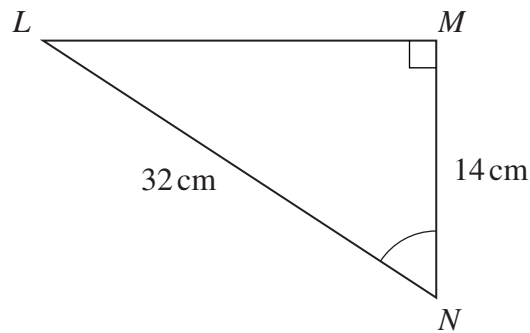
Answer  $x =$  ..... (2 marks)

(b) Find the value of  $x$  when  $C = 32$  and  $y = 3.5$

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

14 In triangle  $LMN$ , angle  $M = 90^\circ$   
 $LN = 32$  cm and  $MN = 14$  cm.



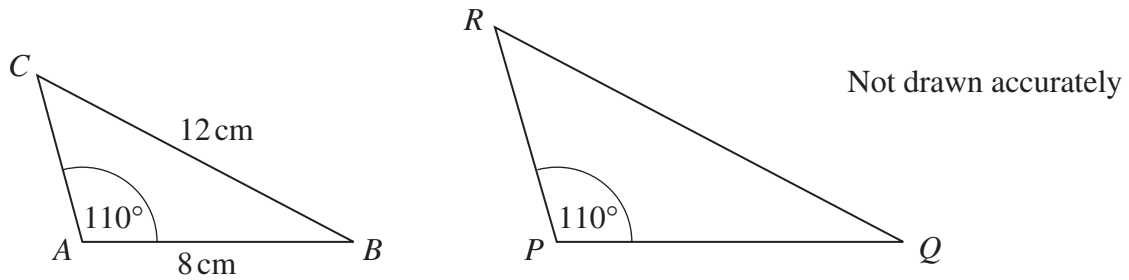
Not drawn accurately

Calculate the size of angle  $N$ .

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

15 Triangle  $PQR$  is an enlargement of triangle  $ABC$  with scale factor  $\frac{5}{4}$ .



Calculate the length of  $RQ$ .

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 .....  
 .....

Answer ..... cm (2 marks)

16 Work out the cube of 0.07  
 Give your answer in standard form.

.....  
 .....

Answer ..... (2 marks)

**Turn over for the next question**

17 Solve the simultaneous equations

$$4x + 3y = 9$$

$$3x - y = 10$$

Do **not** use trial and improvement.

You **must** show your working.

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Answer ..... (3 marks)

**END OF QUESTIONS**