

**GENERAL CERTIFICATE OF SECONDARY EDUCATION**

**B278/B**

**MATHEMATICS C**

**MODULE M8 – SECTION B**

**SPECIMEN**

Candidates answer on the question paper.

Time: 30 minutes

Additional Materials:

- Geometrical instruments
- Tracing paper (optional)
- Scientific or graphical calculator



Candidate  
Name

Centre  
Number

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Candidate  
Number

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### INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above.
- Answer **all** the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- In many questions marks will be given for a correct method even if the answer is incorrect.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.

### INFORMATION FOR CANDIDATES

- You are expected to use a calculator in Section B of this paper.
- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this section is 25.
- Section B starts with Question 8
- Use the  $\pi$  button on your calculator or take  $\pi$  to be 3.142 unless the question says otherwise.

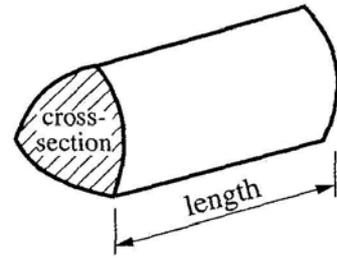
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Section B

This document consists of **8** printed pages.

2  
FORMULAE SHEET

**Volume of prism** = (area of cross-section) x length

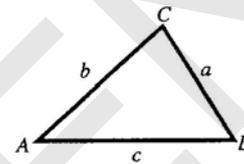


**In any triangle ABC**

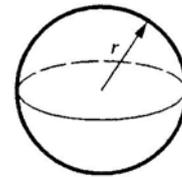
**Sine rule**  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

**Cosine rule**  $a^2 = b^2 + c^2 - 2bc \cos A$

**Area of triangle**  $= \frac{1}{2} ab \sin C$



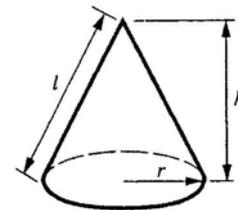
**Volume of sphere**  $\frac{4}{3} \pi r^3$



**Surface area of sphere**  $= 4\pi r^2$

**Volume of cone**  $= \frac{1}{3} \pi r^2 h$

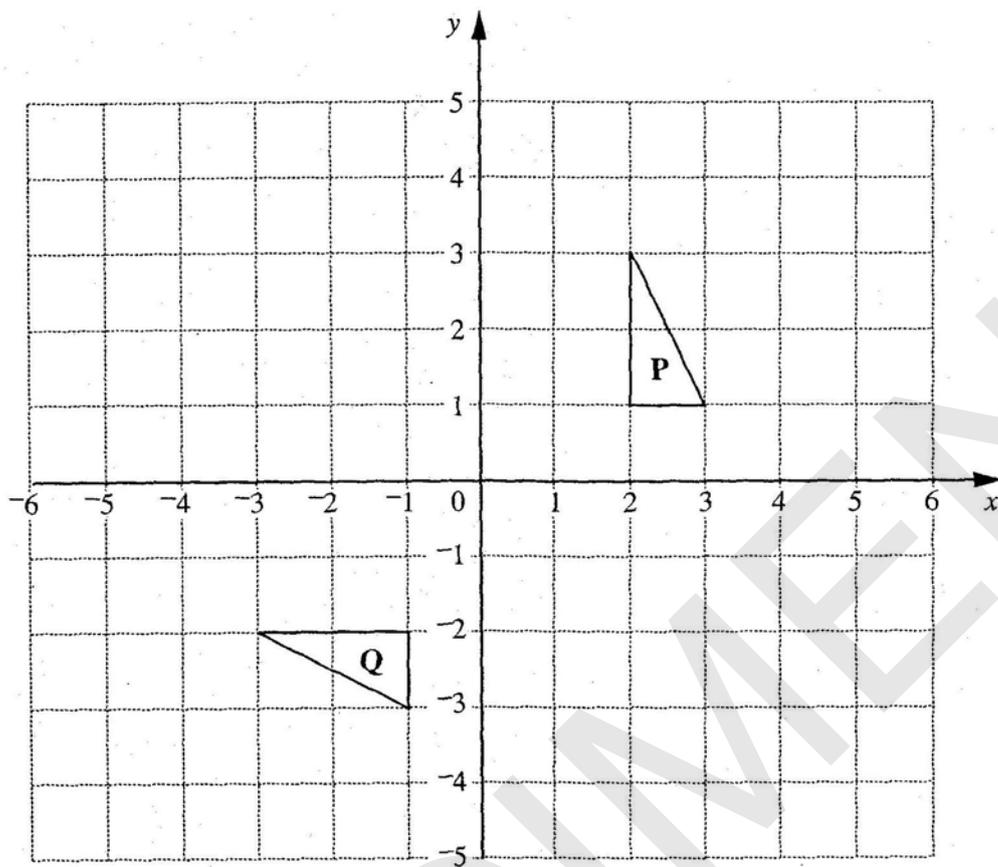
**Curved surface area of cone**  $= \pi rl$



**The Quadratic Equation**

The solutions of  $ax^2 + bx + c = 0$ , where  $a \neq 0$ , are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$



- (a) Describe fully the **single** transformation that maps shape **P** onto shape **Q**.

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[2]

- (b) Translate shape **P** by  $\begin{pmatrix} 1 \\ -4 \end{pmatrix}$ .

Label the image **R**.

[2]

4

[Turn over]

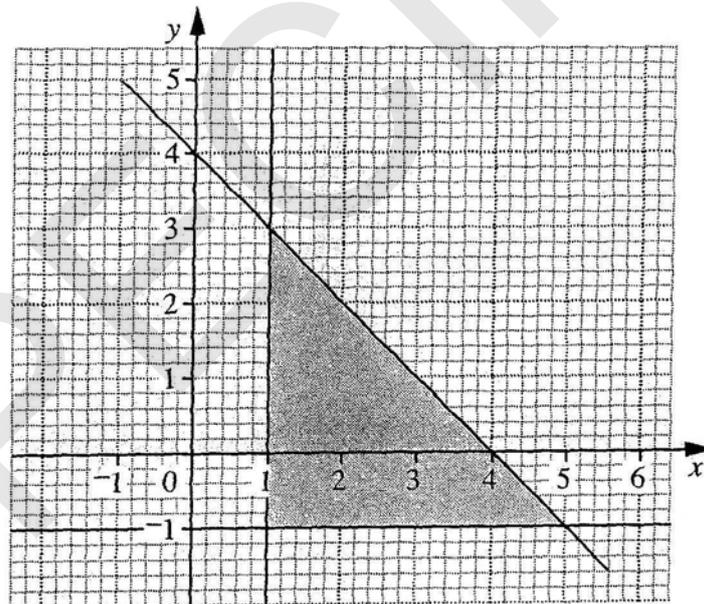
- 9 Pete's height increased from 150cm to 156cm in one year.

Work out the percentage increase in his height.

[3]

3

- 10 Write down the three inequalities satisfied by the shaded region shown on the diagram below.



[3]

3

11 Solve algebraically these simultaneous equations.

$$2x + 5y = 1$$

$$3x - y = 10$$

$x =$  \_\_\_\_\_

$y =$  \_\_\_\_\_ [3]

3
---

[Turn over

- 12 Bronwyn bought a car for £16 500.  
The value of the car depreciates by 15% in its first year.  
Each year after that the car depreciates by 10% of its value at the beginning of that year.



What is the value of the car 3 years after Bronwyn bought it?

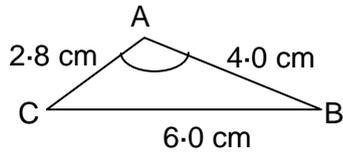
£ \_\_\_\_\_ [4]

4
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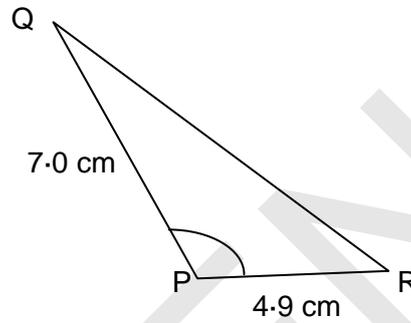
13 In triangles ABC and PQR, angles A and P are the same size.

AB = 4.0 cm, AC = 2.8 cm and BC = 6.0 cm.

PR = 4.9 cm and PQ = 7.0 cm.



Not to scale



(a) Explain how you can tell that these triangles are similar.

.....  
 .....

[1]

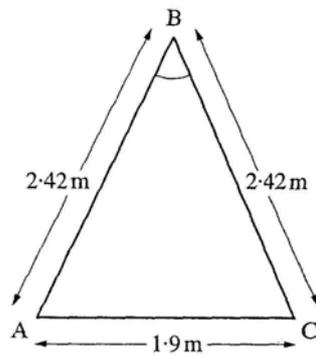
(b) Calculate length QR.

(b) ..... cm [2]

3	

[Turn over

- 14 This is a side view of the frame, ABC, of a child's swing.



Not to scale

$AB = BC = 2.42 \text{ m}$  and  $AC = 1.9 \text{ m}$ .

Calculate angle ABC.

° [5]

5

**Section B Total [25]**

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The maximum mark for this paper is 25.

**SPECIMEN**

8	a)	reflection in line $y = -x$	1 1				
	b)	correct image	2 4	M1	accept correct line drawn and referred to. one error		
9		4%	3 3	M1 M2	6/150 or 156/150 or 0.04 or 1.04		
10		$y \geq -1$	1	W3	all 3 correct. Accept all three without the equality.		
		$x \geq 1$	1	W2	any 2 correct or 1 correct and two equations identified		
		$x + y \leq 4$ , o.e.	1	W1	1 correct or 2 equations identified if W0 then SC1 for $y = -x + 4$ o.e.		
			3				
11		$15x - 5y = 50$	1	M1			
		$17x = 51$	1	M1			
		$x = 3, y = -1$	1	A1	W1 $x = 3, y = -1$ only		
			3				
12		11 359 to 11 361		M3	$16\,500 \times 0.85 \times 0.9^2$ o.e.		
				M2	$16\,500 \times 0.85 \times 0.9$ o.e. or 12 622.5		
				M1	$16\,500 \times 0.85$ o.e. or 14 025 or 10725 s.o.i		
			4		extra year apply as above but lose A mark		
13	(a)	2 pairs of sides in same ratio and [included] angles equal	1				
	(b)	10.5	2 3	M1	ratio = 4/7 or 7/4		

14	46° or 46.2(...)	5	5	<p>W1 0.95 seen</p> <p>M1 <math>\sin = \frac{0.95}{2.42}</math> or <math>\cos = \frac{0.95}{2.42}</math></p> <p>M1 <math>\sin^{-1}\left(\frac{0.95}{2.42}\right)</math> or <math>\cos^{-1}\left(\frac{0.95}{2.42}\right)</math></p> <p>M1 <math>2 \times \text{"sin}^{-1}\text{"}</math> or <math>180 - 2 \times \text{"cos}^{-1}\text{"}</math></p> <p>M1 W4 for 45.9 W3 for 23(.11..) or 66.8(9..), 66.9, 67 SC1 for <math>\sin^{-1}\left(\frac{1.9}{2.42}\right)</math></p>
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Section B Total 25

**Assessment Objectives Grid**

<b>Question</b>	<b>AO2</b>	<b>AO3</b>	<b>AO4</b>	<b>Total</b>
<b>8</b>	0	4	0	<b>4</b>
<b>9</b>	3	0	0	<b>3</b>
<b>10</b>	3	0	0	<b>3</b>
<b>11</b>	3	0	0	<b>3</b>
<b>12</b>	4	0	0	<b>4</b>
<b>13</b>	0	0	3	<b>3</b>
<b>14</b>	0	0	5	<b>5</b>
<b>Totals</b>	<b>13</b>	<b>4</b>	<b>8</b>	<b>25</b>