

**GENERAL CERTIFICATE OF SECONDARY EDUCATION  
MATHEMATICS C**

**B279/A**

MODULE M9 – SECTION A

**SPECIMEN**

Candidates answer on the question paper.

Time: 30 minutes

Additional Materials:

- Geometrical instruments
- Tracing paper (optional)



Candidate  
Name

Centre  
Number

--	--	--	--

Candidate  
Number

--	--	--	--

**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**

- 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.



**WARNING** You are not allowed to use a calculator in this paper.

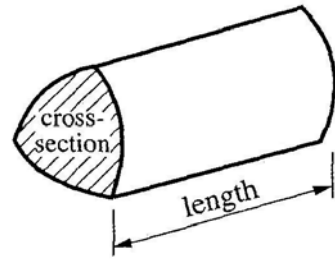
For Examiner's Use

Section A

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

2  
FORMULAE SHEET

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

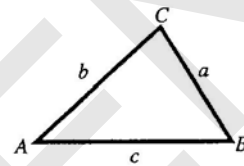


**In any triangle ABC**

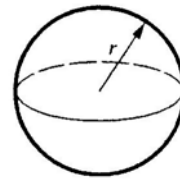
**Sine rule**  $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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

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



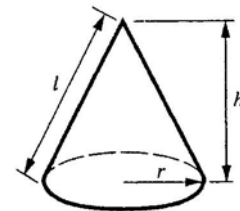
**Volume of sphere**  $\frac{4}{3} \pi r^3$



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

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

**Curved surface area of cone**  $= \pi r l$



**The Quadratic Equation**

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

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

1 Evaluate.

(a)  $5^0$

(a) \_\_\_\_\_ [1]

(b)  $4^{-2}$

(b) \_\_\_\_\_ [1]

(c)  $64^{\frac{1}{3}}$

(c) \_\_\_\_\_ [1]

3

[Turn over

- 2 This table shows the distribution of pupils in a school.

	Y7	Y8	Y9	Y10	Y11	Total
Boys	68	62	54	54	32	270
Girls	62	58	36	36	38	230
Total	130	120	90	90	70	500

A survey is being conducted amongst the pupils of the school.  
It is decided to select a sample of 10% of the pupils.

- (a) The organiser suggests choosing the 50 pupils for the survey by selecting 5 boys and 5 girls from each year group.  
Explain why this is not a representative sample of the pupils in the school.

.....  
.....[1]

- (b) Describe a method of selecting a more representative sample.  
You should use the figures from the table for one year group to help you explain your method.

.....  
.....  
.....  
.....[2]

3
---

3 (a) Factorise.

$$x^2 - 7x + 6$$

(a) \_\_\_\_\_ [2]

(b) Hence simplify.

$$\frac{x^2 - 7x + 6}{x^2 - 36}$$

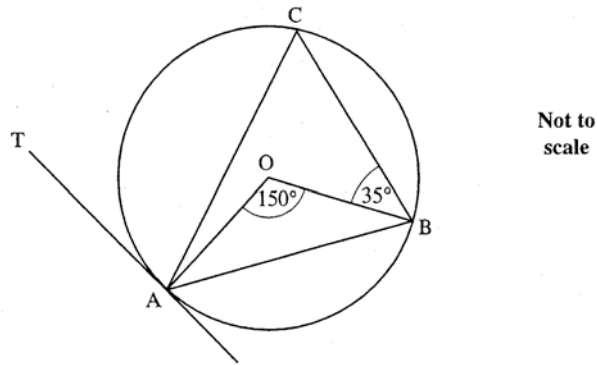
(b) \_\_\_\_\_ [3]

5
---

[Turn over

4

6



Not to scale

A, B and C are points on the circumference of a circle with centre O.  
 TA is a tangent to the circle.  
 Angle AOB =  $150^\circ$  and angle CBO =  $35^\circ$ .

- (a) (i) Find angle ACB.  
 Give a reason for your answer.

Angle ACB = \_\_\_\_\_  $^\circ$  because \_\_\_\_\_

[2]

- (ii) Find angle TAC.  
 Give reasons for your answer.

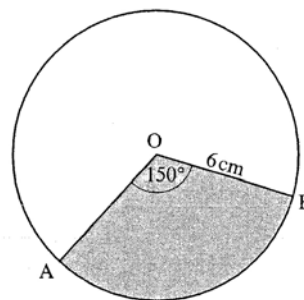
Angle TAC = \_\_\_\_\_  $^\circ$  because \_\_\_\_\_

[3]

- (b) The radius of the circle is 6 cm.

Work out the area of the shaded sector AOB.

Express your answer as simply as possible in the form  $k\pi \text{ cm}^2$ .



Not to scale

(b) \_\_\_\_\_  $\text{cm}^2$  [3]

8
---

- 5 (a) Make  $r$  the subject of this formula.

$$V = \frac{1}{3}\pi r^2 h$$

(a) \_\_\_\_\_ [3]

- (b) Make  $v$  the subject of this formula.

$$u + v = uvf$$

(b) \_\_\_\_\_ [3]

6
---

Section A Total 25

---

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (OCR) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

OCR is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.

SPECIMEN





Oxford Cambridge and RSA Examinations  
General Certificate of Secondary Education

**MATHEMATICS C**

**B278/A**

**MODULE M8 – SECTION A**

**Specimen Mark Scheme**

The maximum mark for this paper is 25.

SPECIMEN

1	a) 1 b) 1/16 or 0.0625 c) 4	1 1 1 3		
2	a) explanation e.g. unequal number of pupils across year gps or unequal numbers of boys and girls in some years b) e.g. Y7 boys $\frac{68}{500} \times 50$ and Y7 girls $\frac{62}{500} \times 50$ . 7 boys and 6 girls.	1 1 1 3	M1 A1	
3	a) $(x - 6)(x - 1)$ b) $(x - 1)/(x + 6)$	2 3 5	M1 M1	for sign error $(x \pm 6)(x \pm 1)$ or for $(x - 2)(x - 3)$ for $x^2 - 36 = (x + 6)(x - 6)$ seen and <b>M1</b> for correct cancelling seen ft for <b>A1</b> if $(x - 6)$ or $(x + 6)$ factor of (a)
4	a) i) 75 angle at centre = $2 \times$ angle at circumference ii) 50 [angle in isos triangle +] alt seg b) $15\pi$	1 1 2 1 3 8	M2	at least one of centre and circumference must be mentioned or any other <b>complete explanation</b> . 1 for angle $ABO = 15^\circ$ [may be on diagram] or any other <b>complete explanation</b> . for $150/360 \times \pi \times 6^2$ or <b>M1</b> for 150/360 of circle

5	a)	$r = \sqrt{\frac{3V}{\pi h}}$	3	<p><b>M1</b> for dealing with 3 correctly [M0 for triple-decker]</p> <p><b>M1</b> for dealing with <math>\pi h</math> correctly</p> <p><b>M1</b> for square root of their <math>r^2 = k</math></p> <p><b>SC2</b> for <math>r^2 = \frac{3V}{\pi h}</math></p> <p><b>W2</b> if <math>r</math> omitted or for triple-decker equiv. <b>or</b></p>
	b)	$v = \frac{u}{uf - 1}$ or $\frac{-u}{1 - uf}$	3	<p><b>W2</b> if <math>v</math> omitted or</p> <p><b>M1</b> for <math>u = uvf - v</math> or <math>v - uvf = -u</math> <b>and M1</b> for <math>u = v(uf - 1)</math> oe.</p> <p>Condone one sign error for 2<sup>nd</sup></p> <p><b>M</b></p>
			6	

Section A Total 25

<b>Question</b>	<b>AO2</b>	<b>AO3</b>	<b>AO4</b>	<b>Total</b>
<b>1</b>	3	0	0	<b>3</b>
<b>2</b>	0	0	3	<b>3</b>
<b>3</b>	5	0	0	<b>5</b>
<b>4</b>	0	8	0	<b>8</b>
<b>5</b>	6	0	0	<b>6</b>
<b>Totals</b>	<b>14</b>	<b>8</b>	<b>3</b>	<b>25</b>

SPECIMEN