



**M9**

**GENERAL CERTIFICATE OF SECONDARY EDUCATION  
MATHEMATICS C (GRADUATED ASSESSMENT)  
MODULE M9 – SECTION A**

**B279A**



Candidates answer on the question paper.

**OCR supplied materials:**  
None

**Other materials required:**

- Geometrical instruments
- Tracing paper (optional)

**Thursday 20 January 2011  
Morning**

**Duration: 30 minutes**



Candidate forename		Candidate surname	
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Centre number							Candidate number				
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**INSTRUCTIONS TO CANDIDATES**

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Show your working. Marks may be given for a correct method even if the answer is incorrect.
- Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
- Answer **all** the questions.
- Do **not** write in the bar codes.

**INFORMATION FOR CANDIDATES**

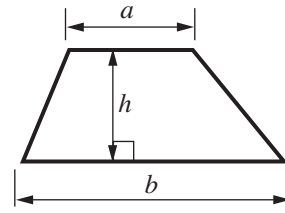
- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this Section is **25**.
- This document consists of **8** pages. Any blank pages are indicated.

**WARNING**

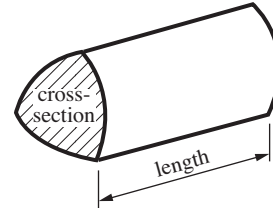
No calculator can be used for Section A of this paper

## Formulae Sheet

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



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

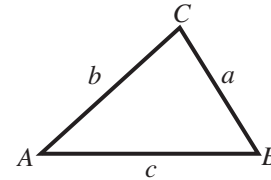


**In any triangle ABC**

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

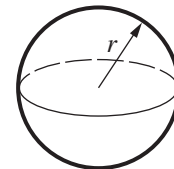
**Cosine rule**  $a^2 = b^2 + c^2 - 2bc \cos A$

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



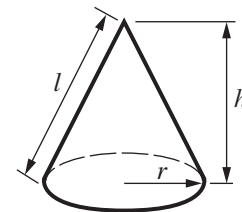
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

**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

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

**PLEASE DO NOT WRITE ON THIS PAGE**

1 Evaluate.

(a)  $25^0$

(a)..... [1]

(b)  $25^{\frac{1}{2}}$

(b)..... [1]

(c)  $\left(\frac{2}{3}\right)^{-2}$

(c)..... [2]

2 A molecule of water has mass  $3 \times 10^{-23}$  g.

Calculate the mass of 5 million molecules of water.  
Give your answer in standard form.

..... g [3]

3 (a) Expand and simplify.

$$(3x - 5)(2x + 1)$$

(a)..... [2]

(b) Factorise.

$$x^2 - 25$$

(b)..... [1]

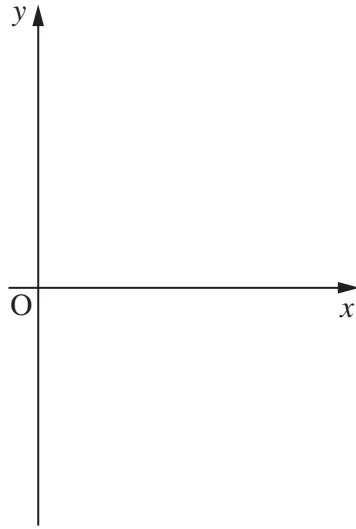
(c) Factorise and solve.

$$2x^2 - 7x + 6 = 0$$

(c)..... [3]

4 You are given that  $y \propto \frac{1}{x}$  and that  $y = 6$  when  $x = 5$ .

(a) Sketch the shape of the graph representing this relationship, for positive values of  $x$ .



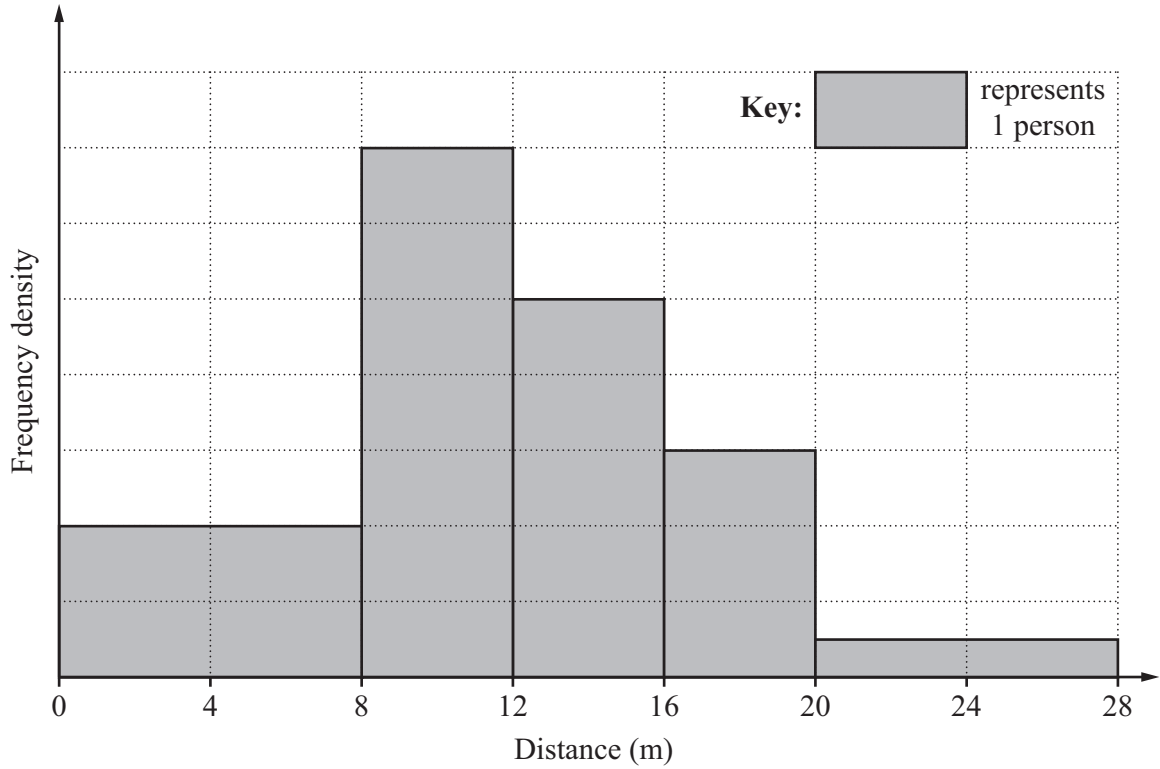
[1]

(b) Find the equation connecting  $y$  and  $x$ .

(b) ..... [3]

5 At a charity event, there was a welly-throwing competition.

(a) This histogram summarises the distances thrown by the girls.



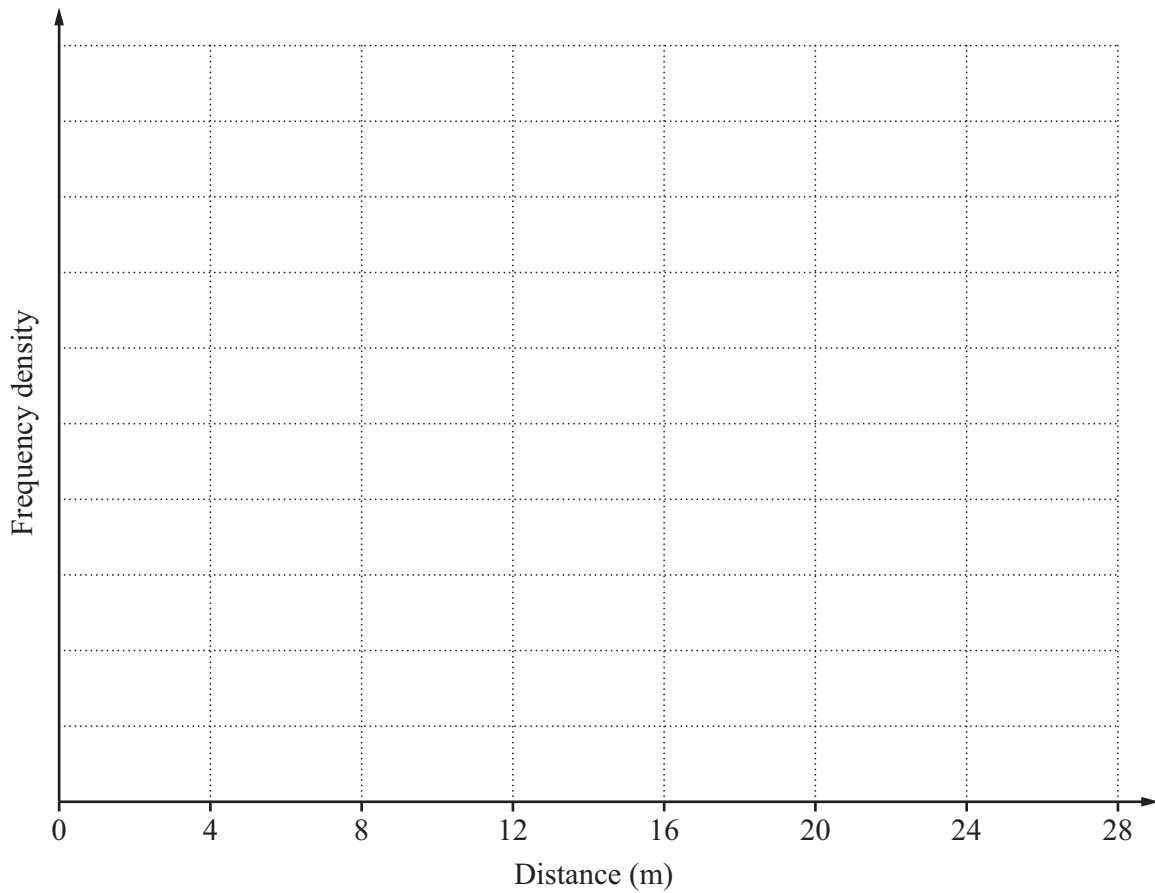
How many girls threw the welly more than 16 metres?

(a) ..... [1]

(b) This table summarises the distances thrown by the boys in the welly-throwing competition.

Distance ( $d$ m)	Frequency
$0 < d \leq 8$	2
$8 < d \leq 12$	6
$12 < d \leq 16$	9
$16 < d \leq 20$	4
$20 < d \leq 28$	3

On the grid below, construct a histogram to represent this information. Use the same scale as the histogram in part (a).



[2]

**TURN OVER FOR QUESTION 6**

6 A line has equation  $y = 5x + 3$ .

(a) Write down the equation of the line which is parallel to  $y = 5x + 3$  and which passes through the point  $(0, -4)$ .

(a)..... [2]

(b) Find the equation of the line which is perpendicular to  $y = 5x + 3$  and which passes through the point  $(10, 4)$ .

(b) ..... [3]



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