



# M8

**GENERAL CERTIFICATE OF SECONDARY EDUCATION**  
**MATHEMATICS C (GRADUATED ASSESSMENT)**  
 MODULE M8 – SECTION A

## B278A



Candidates answer on the question paper.

**OCR supplied materials:**  
None

**Other materials required:**

- Geometrical instruments
- Tracing paper (optional)

**Tuesday 1 March 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.
- 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).
- Show your working. Marks may be given for a correct method even if the answer is incorrect.
- Answer **all** the questions.
- Do **not** write in the bar codes.

**INFORMATION FOR CANDIDATES**

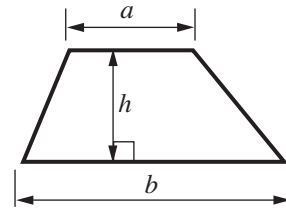
- The number of marks is given in brackets [ ] at the end of each question or part question.
- The total number of marks for this Section is **25**.
- This document consists of **8** pages. Any blank pages are indicated.

**WARNING**

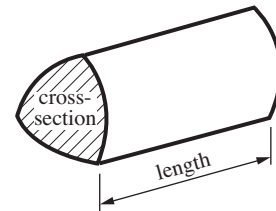
No calculator can be used for Section A of this paper

## Formulae Sheet

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



$$\text{Volume of prism} = (\text{area of cross-section}) \times \text{length}$$

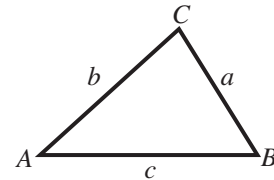


In any triangle  $ABC$

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

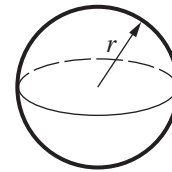
$$\text{Cosine rule} \quad a^2 = b^2 + c^2 - 2bc \cos A$$

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



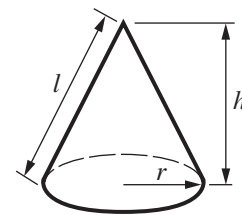
$$\text{Volume of sphere} = \frac{4}{3}\pi r^3$$

$$\text{Surface area of sphere} = 4\pi r^2$$



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

$$\text{Curved surface area of cone} = \pi r l$$



**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 Work out.

$$2\frac{1}{5} + 1\frac{3}{4}$$

Give your answer as a mixed number in its simplest form.

..... [3]

2 (a) Make  $p$  the subject of this formula.

$$r = \frac{p^2}{3} - 4$$

(a) ..... [3]

(b) Expand and simplify.

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

(b) ..... [2]

3 (a) What is the gradient of the line  $y = 3x - 4$ ?

(a) ..... [1]

(b) Give the  $y$ -coordinate of the point where the line  $y = 3x - 4$  crosses the  $y$ -axis.

(b) ..... [1]

(c) Give the equation of a line parallel to  $y = 3x - 4$ .

(c) ..... [1]

4 In this expression  $a$  and  $b$  represent lengths.

Which one of these expressions could represent a volume?

Give a reason for your answer.

$$a^2 + b^2$$

$$\pi a^2(a + b)$$

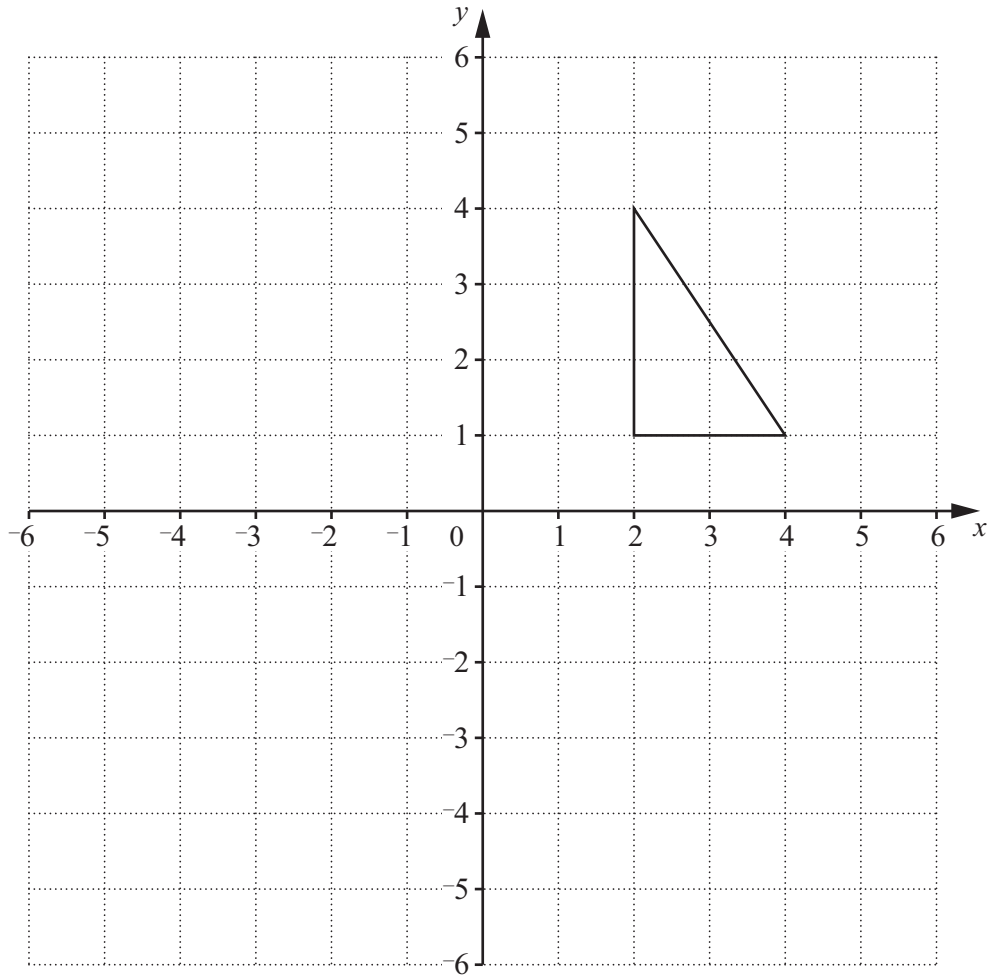
$$3a + 3b$$

$$\frac{1}{2}a(b^2 + a)$$

..... because .....

.....

..... [2]



Find the **single** transformation that is equivalent to:

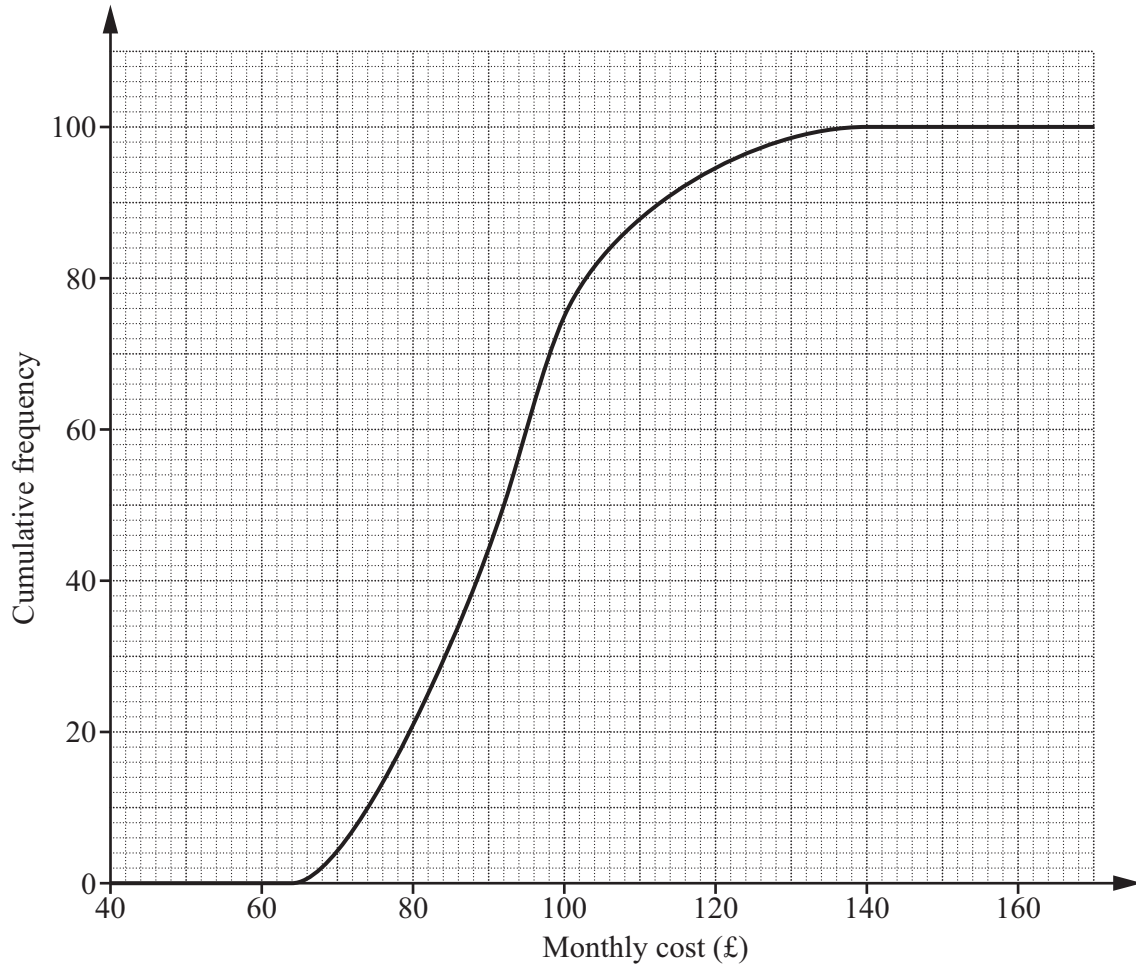
a translation by the vector  $\begin{pmatrix} -4 \\ 0 \end{pmatrix}$  followed by a rotation of  $180^\circ$  about  $(0, 0)$ .

You may use the diagram above to help you.

The single transformation is .....

..... [4]

6 The cumulative frequency graph summarises the total monthly cost of gas and electricity for 100 households using the *Gaztec* company.



(a) Find

(i) the median,

(a)(i) £ ..... [1]

(ii) the interquartile range.

(ii) £ ..... [2]

- (b) *Sparks* is another company providing gas and electricity for households.  
In a survey of 100 households using *Sparks*, the median charge was £84 and the interquartile range was £25.

Use this information to make two comparisons between the distributions of the charges of the two companies.

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

2 .....  
..... [1]

**TURN OVER FOR QUESTION 7**

- 7 The average thickness of the Arctic sea ice in 2000 was reported to be 40% less than in 1970. In 2000, the average thickness of the Arctic sea ice was 1.8 m.

What was its thickness in 1970?

.....m [3]



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