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M8

GENERAL CERTIFICATE OF SECONDARY EDUCATION

MATHEMATICS C (GRADUATED ASSESSMENT) B278A

MODULE M8 – SECTION A

OCE/25781

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

B278A

Candidate forename		Candidate surname	

Centre number						Candidate number				

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

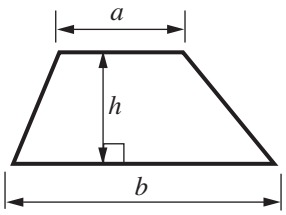
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this Section is **25**.
- This document consists of **8** pages. Any blank pages are indicated.

WARNING

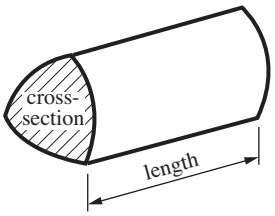
No calculator can be used for Section A of this paper

Formulae Sheet

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



Volume of prism = (area of cross-section) × length

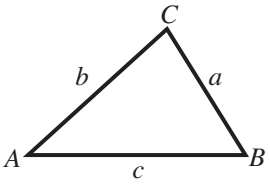


In any triangle ABC

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

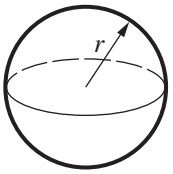
Cosine rule $a^2 = b^2 + c^2 - 2bc\cos A$

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



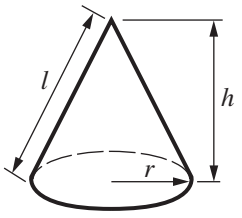
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

Curved surface area of cone = πrl



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.

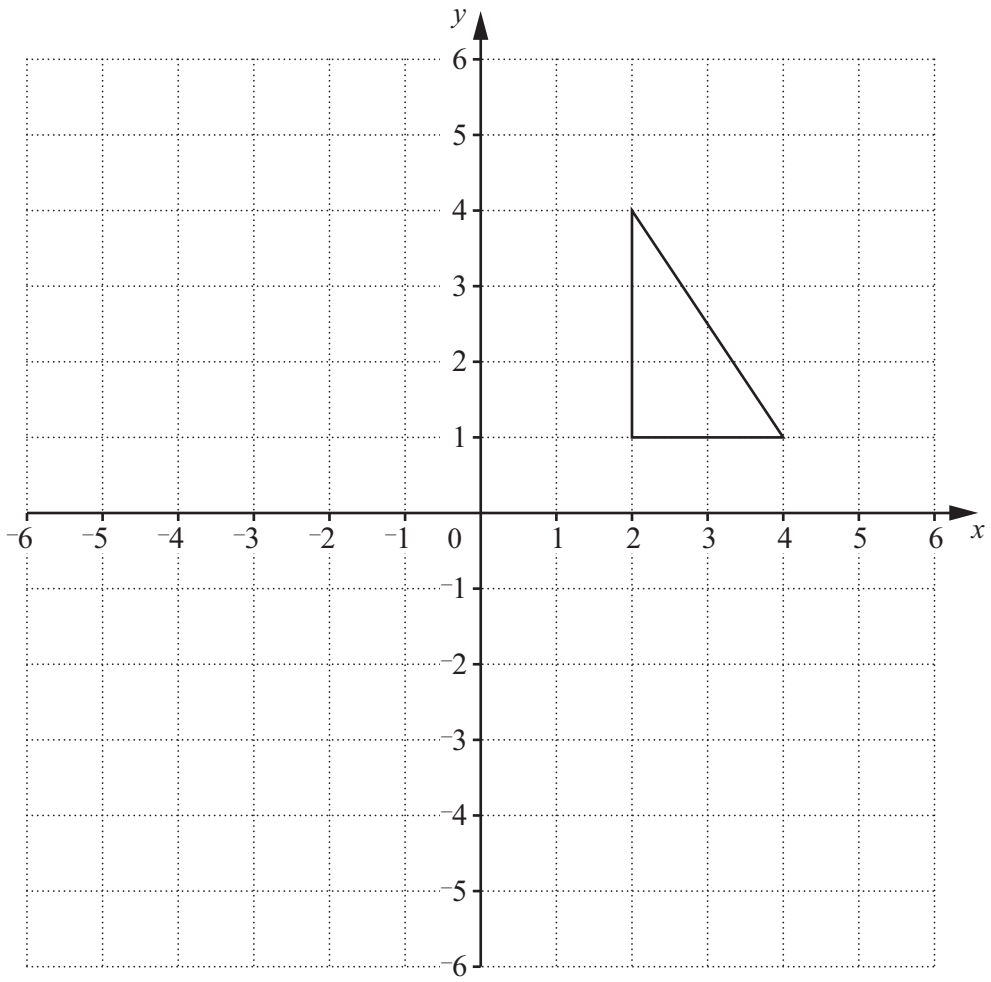
$a^2 + b^2$ $\pi a^2(a + b)$ $3a + 3b$ $\frac{1}{2}a(b^2 + a)$

..... because .....

.....

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

5



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

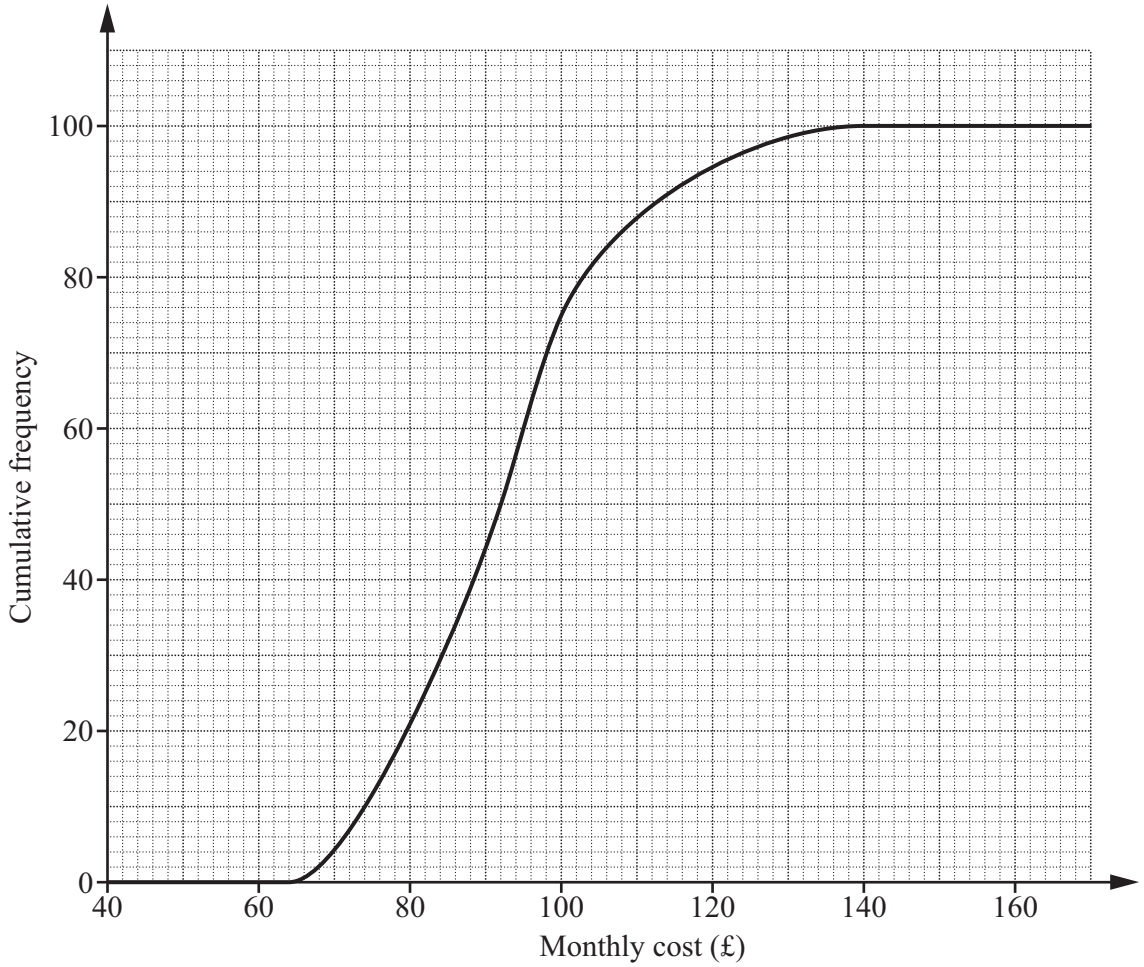
a translation by the vector $\begin{pmatrix} -4 \\ 0 \end{pmatrix}$ followed by a rotation of 180° about (0, 0).

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]**