

GENERAL CERTIFICATE OF SECONDARY EDUCATION
MATHEMATICS C (GRADUATED ASSESSMENT)
Terminal Paper – Section A (Higher Tier)

B282A

Candidates answer on the Question Paper

OCR Supplied Materials:
None

Other Materials Required:

- Geometrical instruments
- Tracing paper (optional)

Monday 7 June 2010
Afternoon

Duration: 1 hour



Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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INSTRUCTIONS TO CANDIDATES

- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that 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.
- Answer **all** the questions.
- Do **not** write in the bar codes.
- 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).

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 **50**.
- This document consists of **12** pages. Any blank pages are indicated.

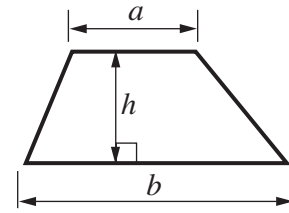
WARNING



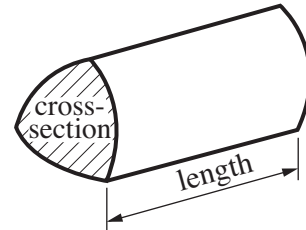
No calculator can be used for Section A of this paper

Formulae Sheet

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



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

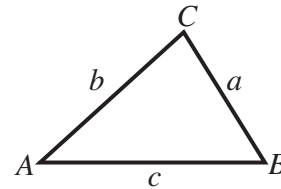


In any triangle ABC

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

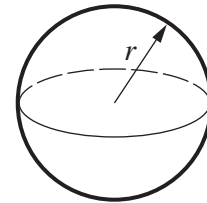
Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$

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



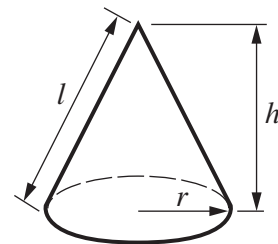
Volume of sphere = $\frac{4}{3} \pi r^3$

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

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

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1 Work out.

$$\frac{4}{5} - \frac{3}{7}$$

..... [2]

2 (a) The n th term of a sequence is $5n - 2$.

Work out the first 3 terms.

(a) [2]

(b) These are the first 5 terms of a different sequence.

7 11 15 19 23

Find an expression for the n th term of this sequence.

(b) [2]

3 Solve.

$$5n + 7 = 2n - 5$$

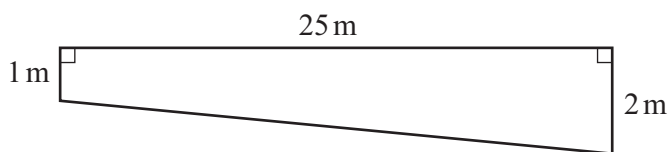
..... [3]

- 4 (a) The length of a swimming pool is 25 m.
James wants to swim a total distance of 1.2 km.

How many lengths will he need to swim?

(a) [3]

- (b) The cross-section of the swimming pool is a trapezium.

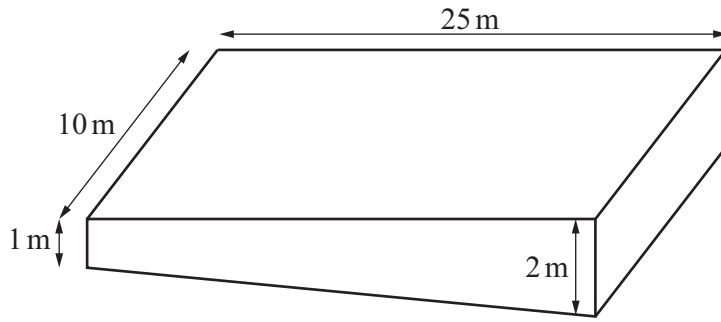


Not to scale

- (i) Work out the area of the cross-section.

(b)(i)m² [2]

- (ii) The width of the pool is 10 m.



Work out the capacity of the pool in litres.
(1 m³ = 1000 litres)

(ii) litres [2]

- (c) After his swim, James rests in the hot tub.
The cross-section of the hot tub is a regular 10-sided polygon.

Show that the interior angle of the polygon is 144°.

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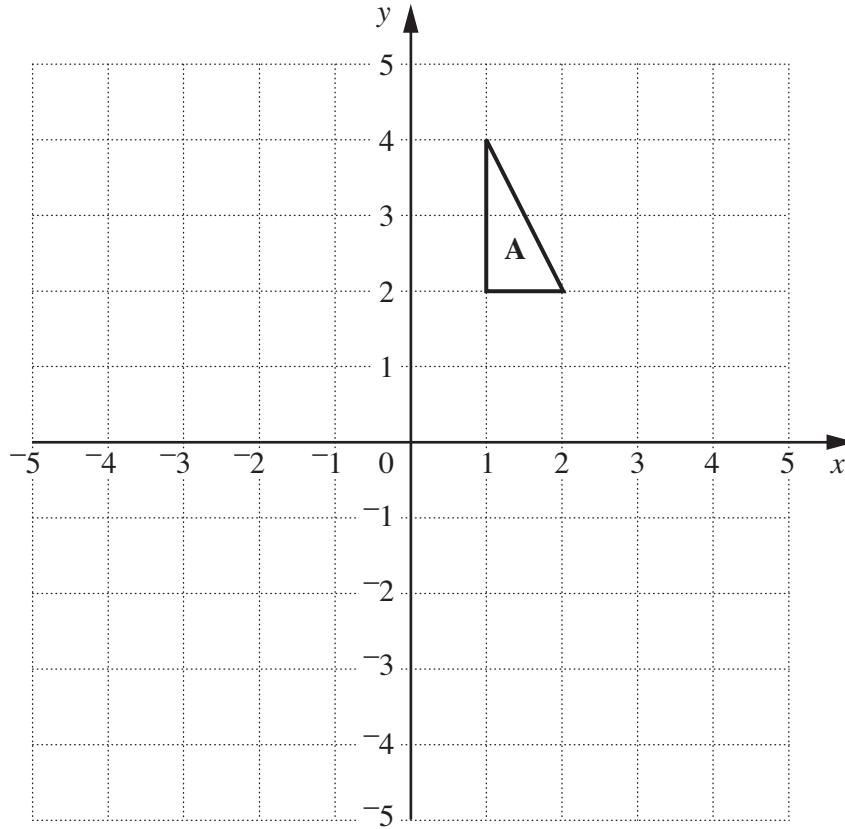
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..... [2]



(a) Reflect triangle **A** in the line $y = 0$.
Label the image **B**. [1]

(b) Rotate triangle **A** 90° anticlockwise with centre $(0, 0)$.
Label the image **C**. [2]

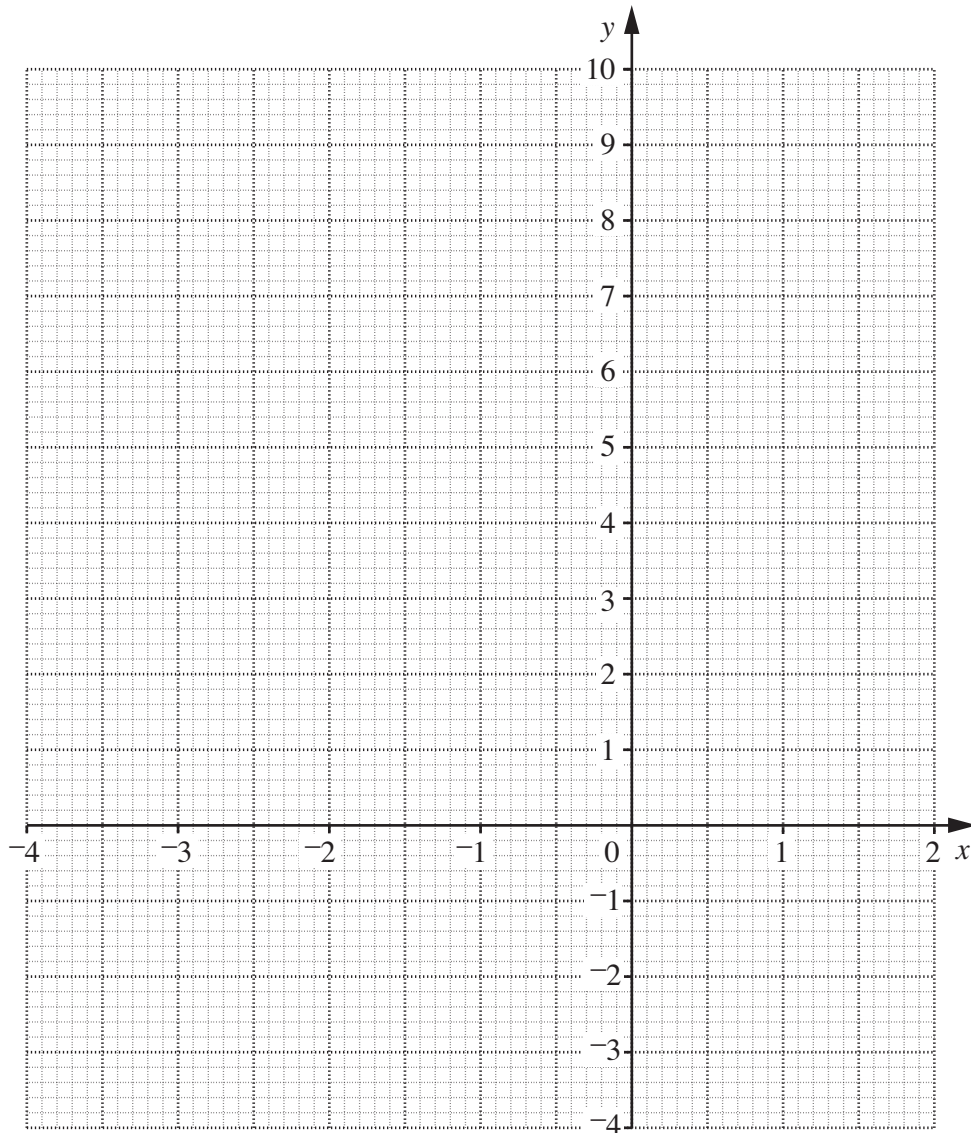
(c) Describe fully the **single** transformation which maps triangle **B** onto triangle **C**.
.....
..... [2]

- 6 (a) Complete this table for $y = x^2 + 3x$.

x	-4	-3	-2	-1	0	1	2
y	4	0	-2		0	4	

[2]

- (b) Draw the graph of $y = x^2 + 3x$.



[2]

- (c) Use your graph to solve the equation $x^2 + 3x = 1$.
Write your answers correct to 1 decimal place.

(c) [2]

- 7 Pete has ordered some souvenir mugs to sell.
 They are delivered in boxes.
 When he opens the first box he finds a faulty mug, so he checks all the mugs in this box.

Condition	Number of mugs
Perfect	30
Faulty	18

- (a) A mug is chosen at random from the first box.

Show that the probability that the mug is faulty is $\frac{3}{8}$.

.....
 [1]

- (b) Altogether Pete has ordered 400 mugs.

About how many would you expect to be faulty?
 Show your working clearly.

(b) [2]

- (c) Pete also ordered some souvenir pens.

The probability that a pen is faulty is $\frac{1}{100}$.

If Pete sold a mug and a pen without checking them first, what is the probability of **both** the mug and the pen being faulty?

(c) [2]

8 (a) Factorise and solve.

$$x^2 - 5x - 14 = 0$$

(a) [3]

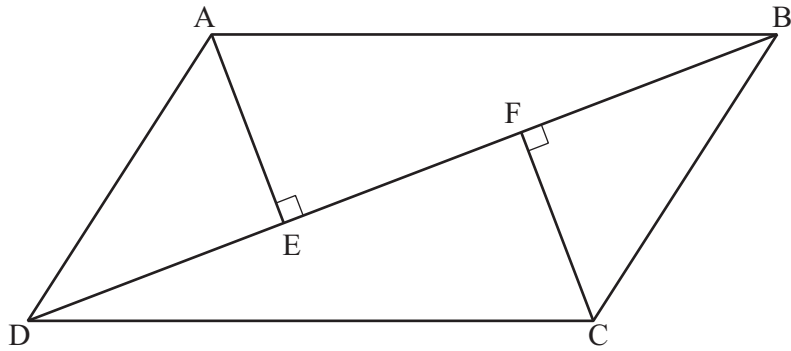
(b) Solve algebraically.

$$\begin{aligned}5x - 2y &= 19 \\6x + y &= 16\end{aligned}$$

(b) $x =$

$y =$ [3]

- 9 ABCD is a parallelogram.
AE and CF are perpendicular to the diagonal BD.



Not to scale

Prove that triangles ABE and CDF are congruent.

.....

.....

.....

.....

..... [3]

10 Work out.

(a) (i) 7^0

(a)(i) [1]

(ii) $125^{-\frac{2}{3}}$

(ii) [3]

(b) Express $0.\dot{4}2\dot{3}$ as a fraction in its simplest form.

(b) [3]

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