

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)

Tuesday 11 January 2011
Morning
Duration: 1 hour



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

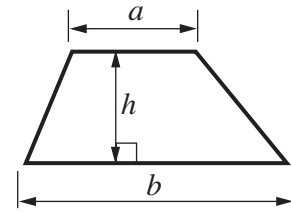
- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this Section is **50**.
- This document consists of **12** pages. Any blank pages are indicated.

WARNING

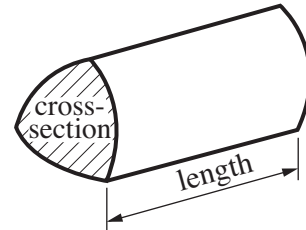
No calculator can be used for Section A of this paper

Formulae Sheet

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



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

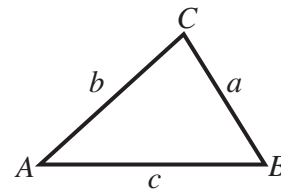


In any triangle ABC

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

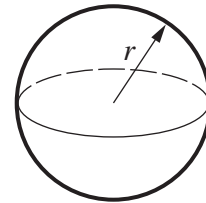
Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$

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



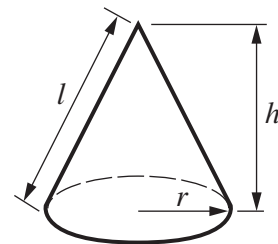
Volume of sphere = $\frac{4}{3} \pi r^3$

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

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

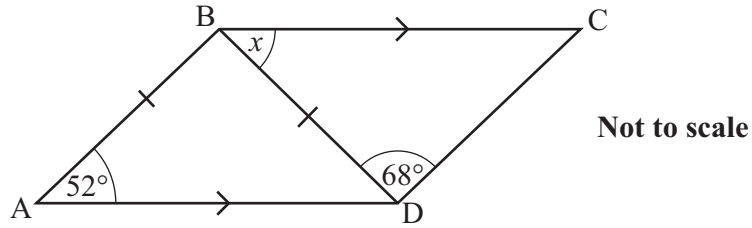
PLEASE DO NOT WRITE ON THIS PAGE

- 1 A pizza shop gives a 15% discount if the customer collects the pizza.
The price of a Hawaiian pizza is £8.40.
Jane decides to collect the pizza.

Work out how much Jane pays for the pizza.

£ [3]

- 2 This is a sketch of a quadrilateral ABCD.
 BA = BD and BC is parallel to AD.
 Angle BAD = 52° and angle BDC = 68° .



- (a) Find angle x , giving reasons for your answer.

$x = \dots\dots\dots^\circ$ because $\dots\dots\dots$
 $\dots\dots\dots$
 $\dots\dots\dots$
 $\dots\dots\dots$ [3]

- (b) Is ABCD a parallelogram?
 Give a reason for your answer.

$\dots\dots\dots$ because $\dots\dots\dots$
 $\dots\dots\dots$ [1]

3 These are the pulse rates, in beats per minute, of 20 members of an exercise class at the start of a session.

92	85	77	52	61	86	58	82	72	73
64	75	76	77	90	87	88	83	72	69

(a) Construct an **ordered** stem and leaf table for the data.

.....
.....
.....
.....
.....

Key [3]

(b) (i) Find the median and range of the pulse rates at the start of the session.

(b)(i) median beats per minute
 rangebeats per minute [3]

(ii) The pulse rates of the same 20 members were also recorded at the end of the session. The median was 81 beats per minute and the range was 40 beats per minute.

Make two comments comparing their pulse rates at the start and end of the session.

1

.....

2

..... [2]

4 Anna, Beth and Cara are sisters.
Anna is x years old.
Beth is 7 years older than Anna.
Cara is twice as old as Anna.

- (a) Write down an expression in x for the total of their ages.
Simplify the expression.

(a) [2]

- (b) The total of the three ages is 55.

Write an equation in x and solve it to find the age of each sister.

(b) Anna years

Beth years

Cara years [3]

- 5 A stone is thrown vertically upwards.
Its height is given by this formula.

$$h = 30t - 5t^2$$

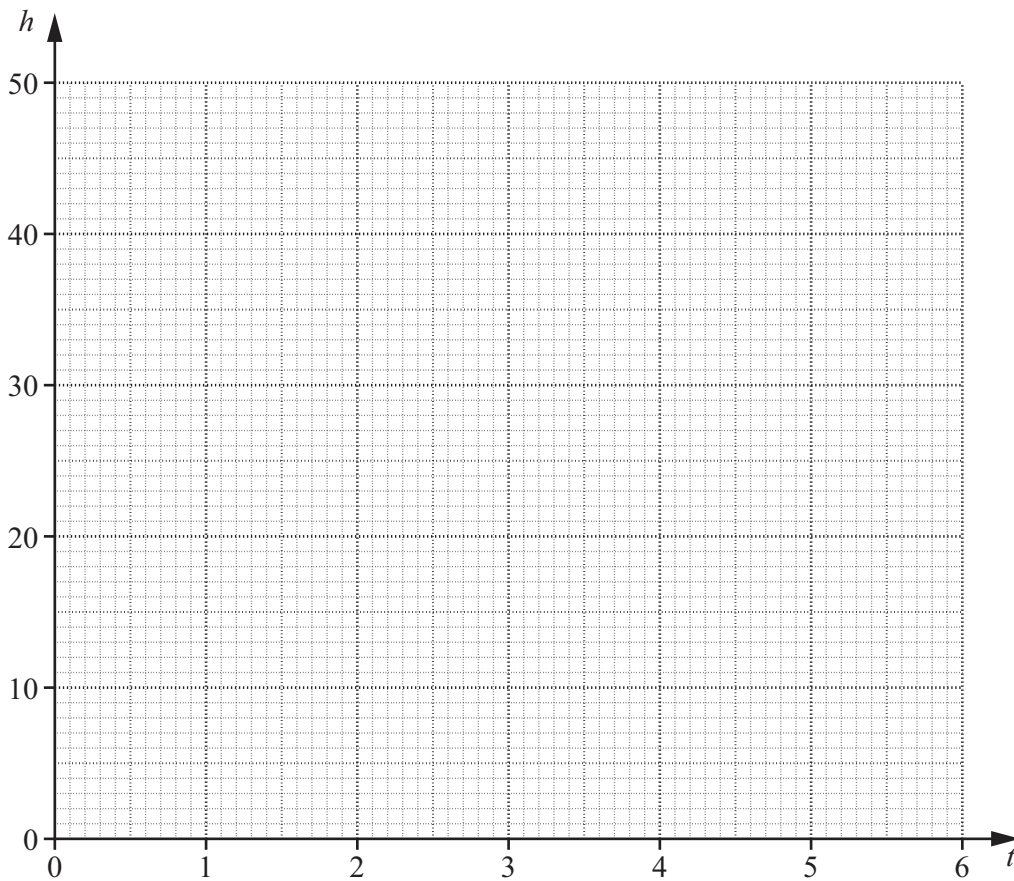
h is the height above the ground in metres, t seconds after it is thrown.

- (a) Complete the table for $h = 30t - 5t^2$.

t	0	1	2	3	4	5	6
h	0			45			0

[2]

- (b) (i) Draw the graph of $h = 30t - 5t^2$.



[2]

- (ii) Find the values of t when the stone is 20 m above the ground.

(b)(ii) [2]

6 (a) Show that $2^4 \times 3 \times 5 = 240$.

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

(b) Write 150 as a product of its prime factors.

(b) [2]

(c) Find the highest common factor (HCF) of 150 and 240.

(c) [1]

7 A game is played with two fair six-sided dice, each numbered from 1 to 6.

- (a) To start the game a player needs to throw two sixes.
Gopal throws the two dice.

What is the probability that he throws two sixes?

(a) [2]

- (b) Amar is playing the game with Gopal.
In the game each player throws the dice and adds the two numbers together.
To get a bonus, Amar needs a total of 9 and Gopal needs a total of 4.

Who is more likely to get a bonus on his next throw?
Explain your answer fully.

..... is more likely to get a bonus because

.....

..... [2]

8 Work out.

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

Give your answer as a mixed number.

..... [3]

- 9 (a) Solve this inequality.

$$3n - 7 \leq 17 - 5n$$

(a) [2]

- (b) Rearrange $\frac{y + 3}{4} = 2x + 5$ to make y the subject.

Write your answer as simply as possible.

(b) [3]

- 10 (a) Work out $(\sqrt{3})^2$.

(a) [1]

- (b) Expand and simplify $(4 + \sqrt{3})^2$.
Write your answer in the form $a + b\sqrt{3}$.

(b) [2]

TURN OVER FOR QUESTION 11

11 (a) Simplify.

$$(5x^2y)^3$$

(a) [2]

(b) Simplify.

$$\frac{3x^3 - 12x}{x^2 - 2x}$$

(b) [3]

Copyright Information

OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download from our public website (www.ocr.org.uk) after the live examination series. If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.

For queries or further information please contact the Copyright Team, First Floor, 9 Hills Road, Cambridge CB2 1GE.

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.