OCR
Oxford Cambridge and RSA

H

Thursday 26 May 2016 – Morning

GCSE MATHEMATICS A

A501/02 Unit A (Higher Tier)

Candidates answer on the Question Paper.

OCR supplied materials:
None

Other materials required:
- Scientific or graphical calculator
- Geometrical instruments
- Tracing paper (optional)

Duration: 1 hour

* A 5 0 1 0 2 *

* 5 9 9 8 4 3 5 2 9 2 *

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. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Your answers should be supported with appropriate 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).
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

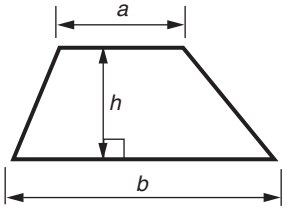
- The number of marks is given in brackets **[ ]** at the end of each question or part question.
- The total number of marks for this paper is **60**.
- This document consists of **16** pages. Any blank pages are indicated.

You are permitted to use a calculator for this paper

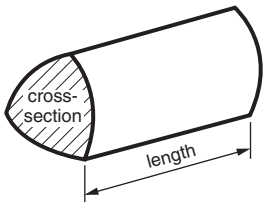
DC (NH/FD) 124883/1

Formulae Sheet: Higher Tier

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



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

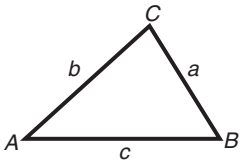


In any triangle *ABC*

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

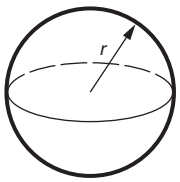
Cosine rule $a^2 = b^2 + c^2 - 2bc\cos A$

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



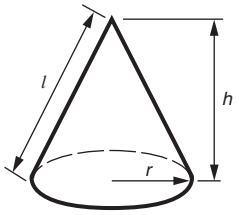
Volume of sphere $= \frac{4}{3}\pi r^3$

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



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

Curved surface area of cone $= \pi rl$



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

Answer **all** the questions.

1 On a packet of brown rice it says:

When 60 g of brown rice is cooked it will weigh 145 g.

(a) Katy has 100 g of brown rice.

What will the rice weigh when it is cooked?

(a) ..... g **[2]**

(b) Pali needs 400 g of cooked rice for a recipe.

What weight of brown rice should he cook?

(b) ..... g **[2]**

(c) Write the ratio 60 : 145 in the form 1 : n, where n is a fraction in its simplest form.

(c) 1 : ..... **[2]**

2 **(a)** Calculate.

$$\sqrt{\frac{63.4^3}{0.083}}$$

Give your answer correct to the nearest 1000.

(a) ..... **[2]**

(b) Calculate.

$$\frac{61.7 - 48.2}{5.6 \times 0.3}$$

Give your answer correct to two decimal places.

(b) ..... **[2]**

3 **(a)** *Manton Inn* has this formula for the total cost, £P, for room hire and a meal for n people.

$P = 48 + 12n$

Find the total cost at *Manton Inn* for room hire and a meal for 25 people.

(a) £ ..... **[2]**

(b) *Carney Hotel* charges £20 for the hire of the room and £16 per person for a meal.

Write a formula for the total cost, £C, of room hire and a meal for n people at this hotel.

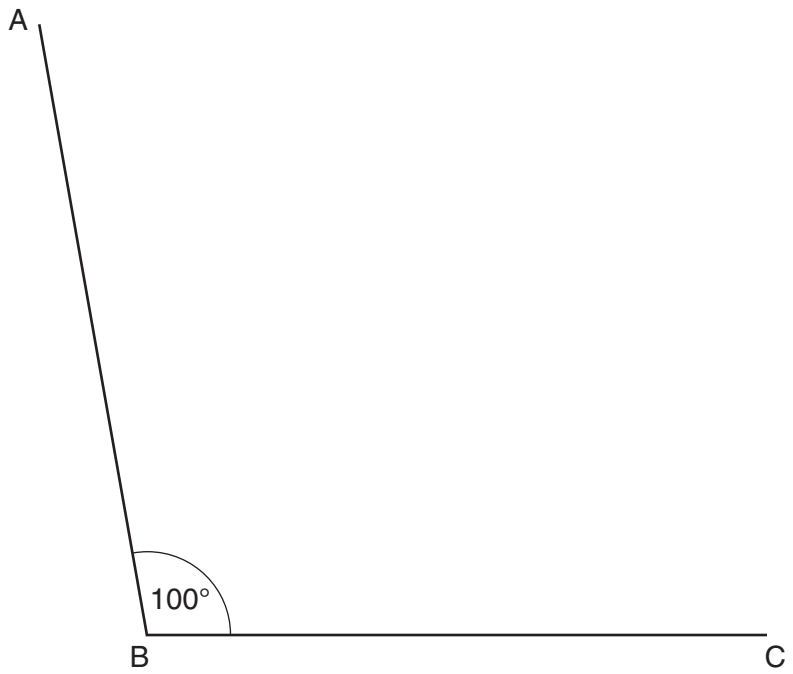
(b) ..... **[2]**

(c) Write an equation in terms of n for which the total cost at *Carney Hotel* and *Manton Inn* is the same.
Solve this equation to find n.

(c) ..... **[3]**

4 *In this question, use a ruler, a protractor and a pair of compasses.*
Do not rub out your construction lines.

Quadrilateral ABCD has two sides AB and BC each of length 8.2 cm.
Angle ABC = 100° and angle BCD = 105°.
Side AD has length 11.7 cm.



(a) Complete the drawing of quadrilateral ABCD. **[3]**

(b) **Construct** the bisector of angle ABC. **[2]**

5 **(a)** The nth term of a sequence is $5n + 2$.

Write down the first three terms of this sequence.

(a) .... **[2]**

(b) Here are the first four terms of another sequence.

17 14 11 8

Find an expression for the nth term of this sequence.

(b) ..... **[2]**

6 **(a)** For one home game, a football club sold these tickets:

Category	Ticket price (£)	Number of tickets	
Executive boxes	43	417	
Adult	26	5238	
Concessions	14	2175	
Juniors	7	930	
	Totals	8760	

Calculate the mean price of these 8760 tickets.

(a) £ ..... **[3]**

(b) Jonny was a fan attending the match.
The football stadium was 150 km from his home, on a bearing of 240°.

(i) Roughly, how many miles is 150 km?

(b)(i) .....miles **[1]**

(ii) Roughly, in what compass direction is a bearing of 240°?
Ring the correct answer.

North	South	East	West
North-East	South-East	North-West	South-West

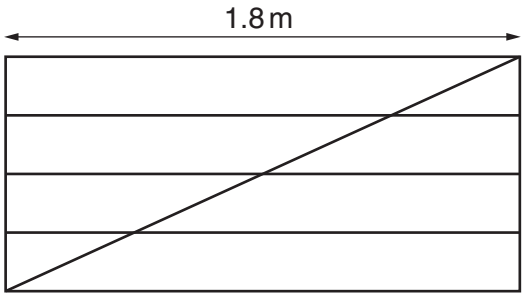
[1]

(iii) He used 17 litres of fuel on his car journey that day.

Roughly, how many gallons is 17 litres?

(iii) .....gallons **[1]**

7 **(a)** A gate has five horizontal bars and two vertical bars.
It also has one diagonal bar to keep the gate in the shape of a rectangle.
The length of each horizontal and each vertical bar is in the ratio 3 : 2.
The horizontal bars each have length 1.8 m.

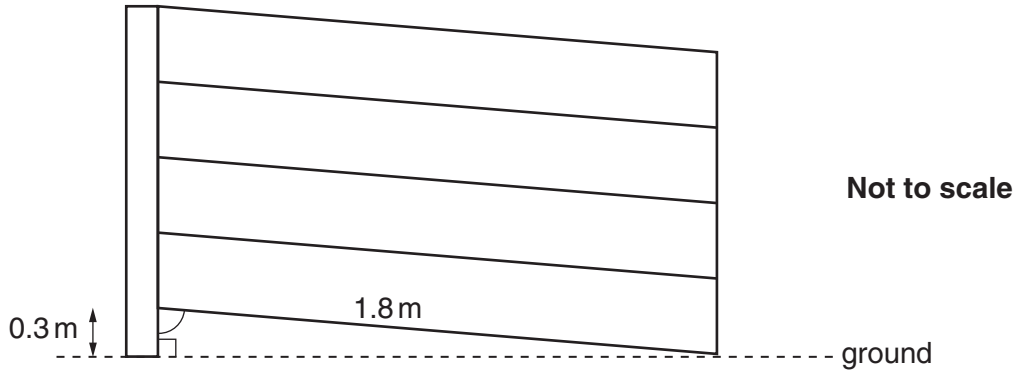


Not to scale

Calculate the total length of the eight bars used to make the gate.

(a) ..... m **[6]**

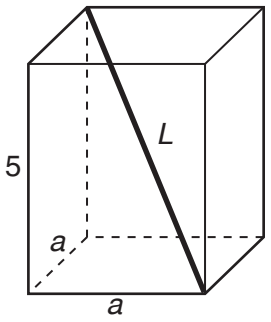
(b) Another gate is made using the same size horizontal and vertical bars but without a diagonal bar.
It is fixed to a gatepost with one end of the bottom bar 0.3 m above the level ground.
It is now no longer a rectangle and is touching the ground at the other end, as shown.



Calculate the angle between the bottom bar and the gatepost.

(b) ..... ° **[3]**

8 A cuboid of height 5 cm has a square base of side a cm.
The longest diagonal of the cuboid is L cm.



Show that $a = \sqrt{\frac{L^2 - 25}{2}}$. **[4]**

9 Eli and Jo each asked 50 people in their year group how many hours they used their mobile phone last Saturday.

(a) Here are Eli's results.

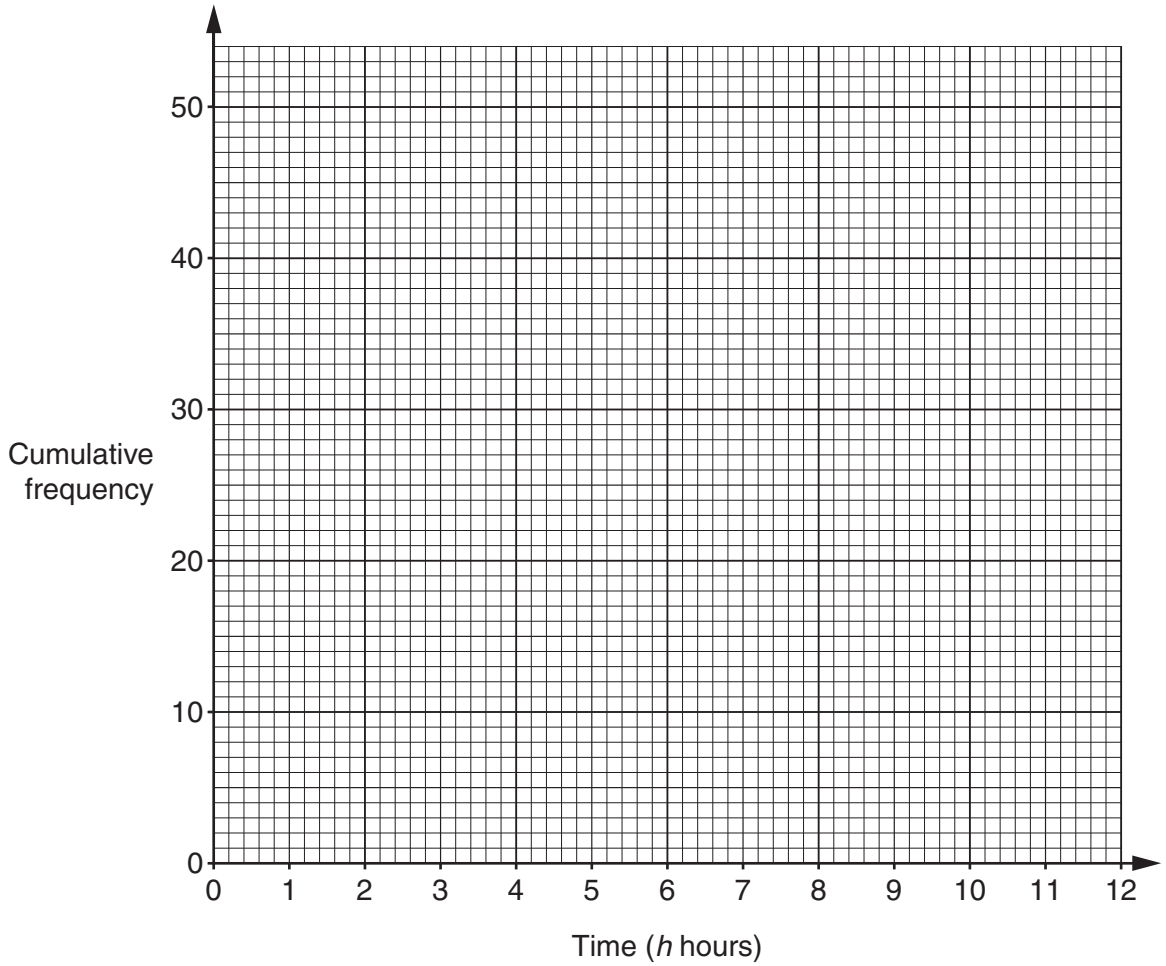
Time (*h* hours)	Tallies
$h = 0$	II
$0 < h \leqslant 2$	IIII
$2 < h \leqslant 4$	𝍸 III
$4 < h \leqslant 6$	𝍸 𝍸 III
$6 < h \leqslant 8$	𝍸 𝍸 𝍸 II
$8 < h \leqslant 10$	𝍸
$10 < h \leqslant 12$	I

(i) Complete this cumulative frequency table for Eli's results.

Time (*h* hours)	$h = 0$	$h \leqslant 2$	$h \leqslant 4$	$h \leqslant 6$	$h \leqslant 8$	$h \leqslant 10$	$h \leqslant 12$
Cumulative frequency	2	6					

[1]

(ii) Draw a cumulative frequency diagram to represent Eli's results.

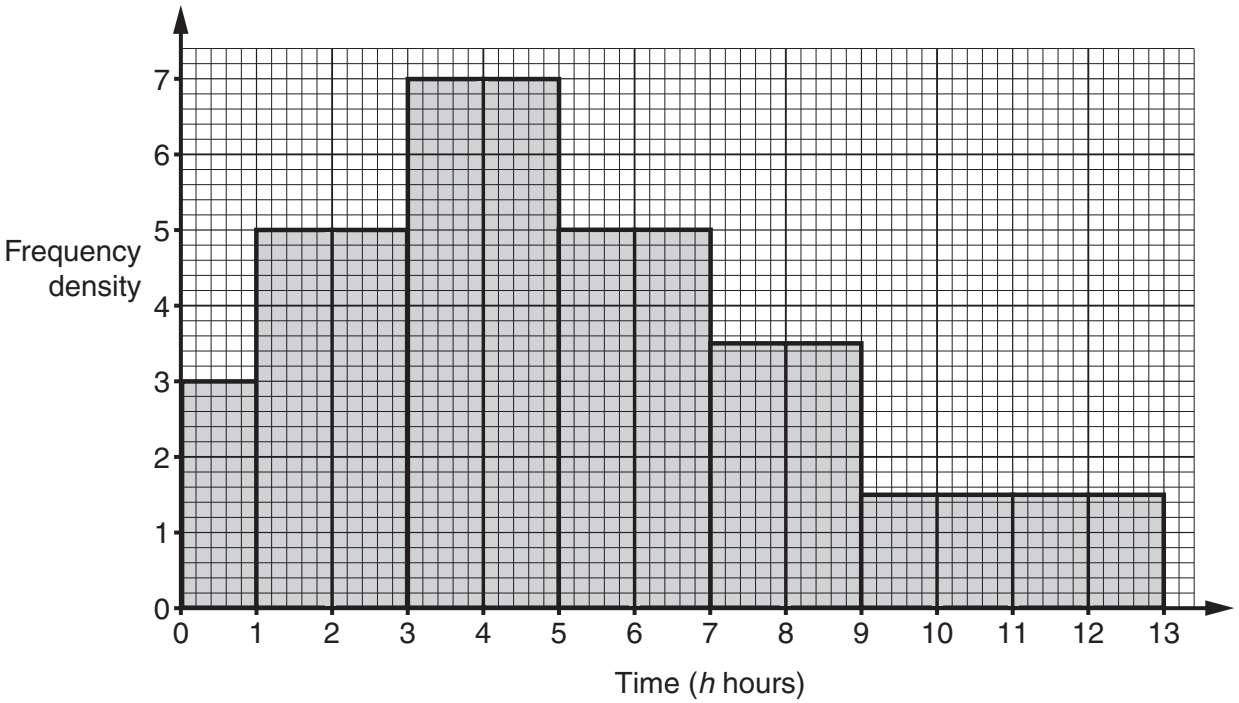


[3]

(iii) Use your cumulative frequency diagram to find an estimate of the interquartile range of Eli's results. Show how you obtain your answer.

(iii) ..... hours **[2]**

(b) Jo asked 50 different people in their year group the same question.
She drew this histogram to represent her results.



How many people in Jo's survey used their mobile phone for more than 7 hours?

(b) ..... **[2]**

10 (a) Rearrange the following to make m the subject.

$$4(m - 2) = t(5m + 3)$$

(a) ..... **[4]**

(b) You are given that $g(x) = ax + b$.
You are also given that $g(0) = 4$ and that $g(1) = -6$.

Find the value of a and the value of b.

(b) $a =$ .....

$b =$ ..... **[3]**

END OF QUESTION PAPER

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