

**OCR**

Oxford Cambridge and RSA

**H****Thursday 21 May 2015 – 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

Candidate forename		Candidate surname	
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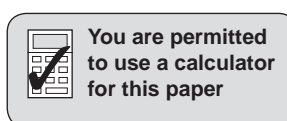
Centre number							Candidate number				
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**INSTRUCTIONS TO CANDIDATES**

- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. 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.

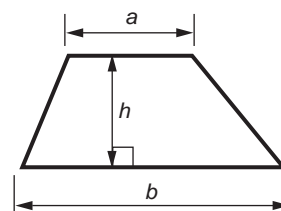
**INFORMATION FOR CANDIDATES**

- 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.

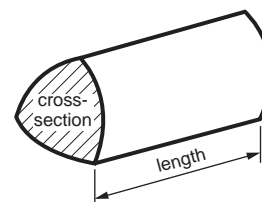


## Formulae Sheet: Higher Tier

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



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

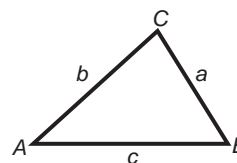


**In any triangle ABC**

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

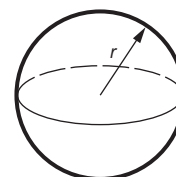
**Cosine rule**  $a^2 = b^2 + c^2 - 2bc \cos A$

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



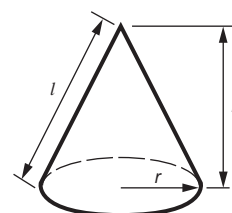
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

**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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3

1 Samira and Joanne share their living costs in the ratio 3 : 2.

(a) The rent for their flat for a month is £700.

Work out how much of this rent they each pay.

(a) Samira £ .....

Joanne £ ..... [3]

(b) For one gas bill, Joanne pays £84 for her share.

How much was the whole gas bill?

(b) £ ..... [3]

4

2 Calculate.

(a)  $\frac{13.72 - 8.96}{8.4 \times 6.4}$

Give your answer correct to 3 decimal places.

(a) ..... [2]

(b)  $\sqrt{80.2^3 + 250}$

Give your answer correct to the nearest 100.

(b) ..... [2]

5

3 (a) When  $a = -5$ ,  $b = -2$  and  $c = 6$ , find the value of

(i)  $a^2$ ,

(a)(i) ..... [1]

(ii)  $1000b$ ,

(ii) ..... [1]

(iii)  $\frac{a+c}{b}$ .

(iii) ..... [1]

(b) Solve these equations.

(i)  $2(3x - 1) = 10x - 5$

(b)(i) ..... [4]

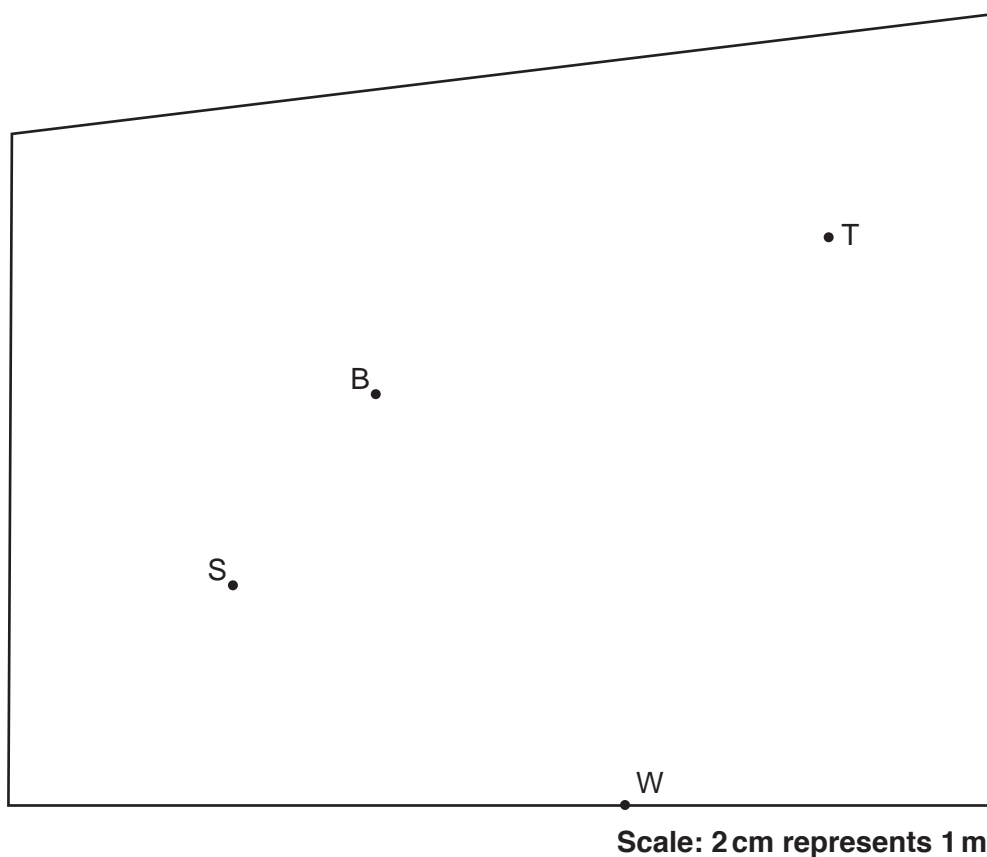
(ii)  $x^2 - 4 = 60$

(ii) ..... [3]

6

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

This scale drawing shows Colin's garden.



Colin wants to put a bird feeder in his garden.  
He wants it to be

- up to 3 m from the tree T
- up to 2 m from the bush B
- nearer to the water tap W than to the seat S.

Construct the region where Colin can put the bird feeder.  
Label the region R.

[5]

7

- 5 (a) The  $n$ th term of a sequence is  $6n - 2$ .

Find the first three terms of this sequence.

(a) ..... [2]

- (b) The  $n$ th term of another sequence is  $5n^2$ .

Is the number 1000 a term in this sequence?  
Show how you decide.

[3]

- 6 (a) Form 11T had 30 students.  
Sasha asked each of the students how many items they had downloaded the previous day.  
This table summarises their responses.

Number of downloads	Frequency
0	4
1 – 5	2
6 – 10	8
11 – 15	7
16 – 20	6
21 – 25	2
26 – 30	1

- (i) Write down the modal class.

(a)(i) ..... [1]

- (ii) Calculate an estimate of the mean number of downloads.

(ii) ..... [4]



9

- (b) Sasha decides to ask a random sample from the whole school how many items they had downloaded the previous day. This sample is to be representative of the different year groups. She decides to use a sample size of 50.

Here are the numbers in each year group.

Year	Number of students
7	155
8	170
9	178
10	180
11	165
12	102
13	93
Total	1043

- (i) Calculate how many Year 13 students should be in the sample.

(b)(i) ..... [2]

- (ii) State one advantage and one disadvantage of Sasha using a larger sample size than 50.

Advantage: .....

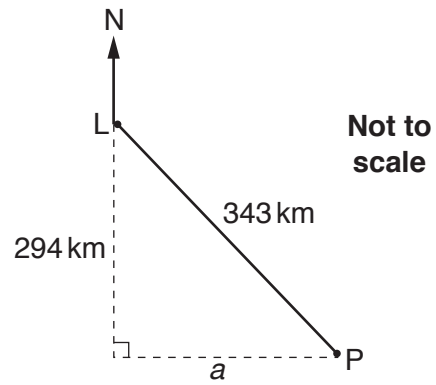
.....

Disadvantage: .....

..... [2]

10

- 7 Paris, P, is 343 km from London, L.  
It is 294 km south of London.



- (a) Calculate  $a$ , the distance that Paris is east of London.

(a) .....km [3]

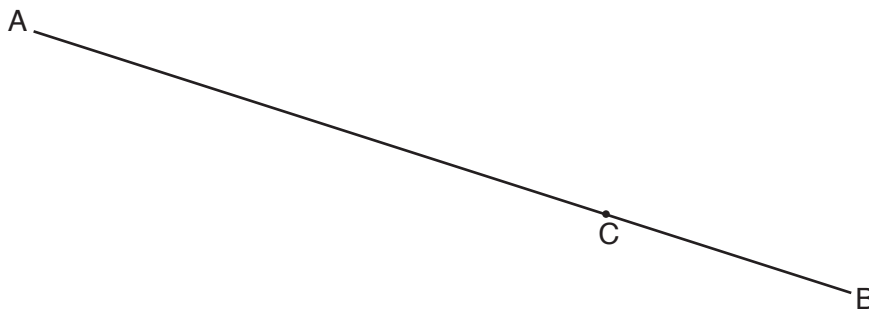
- (b) Calculate the bearing of Paris from London.

(b) .....° [4]

11

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

Construct the perpendicular to AB which passes through point C.



[2]

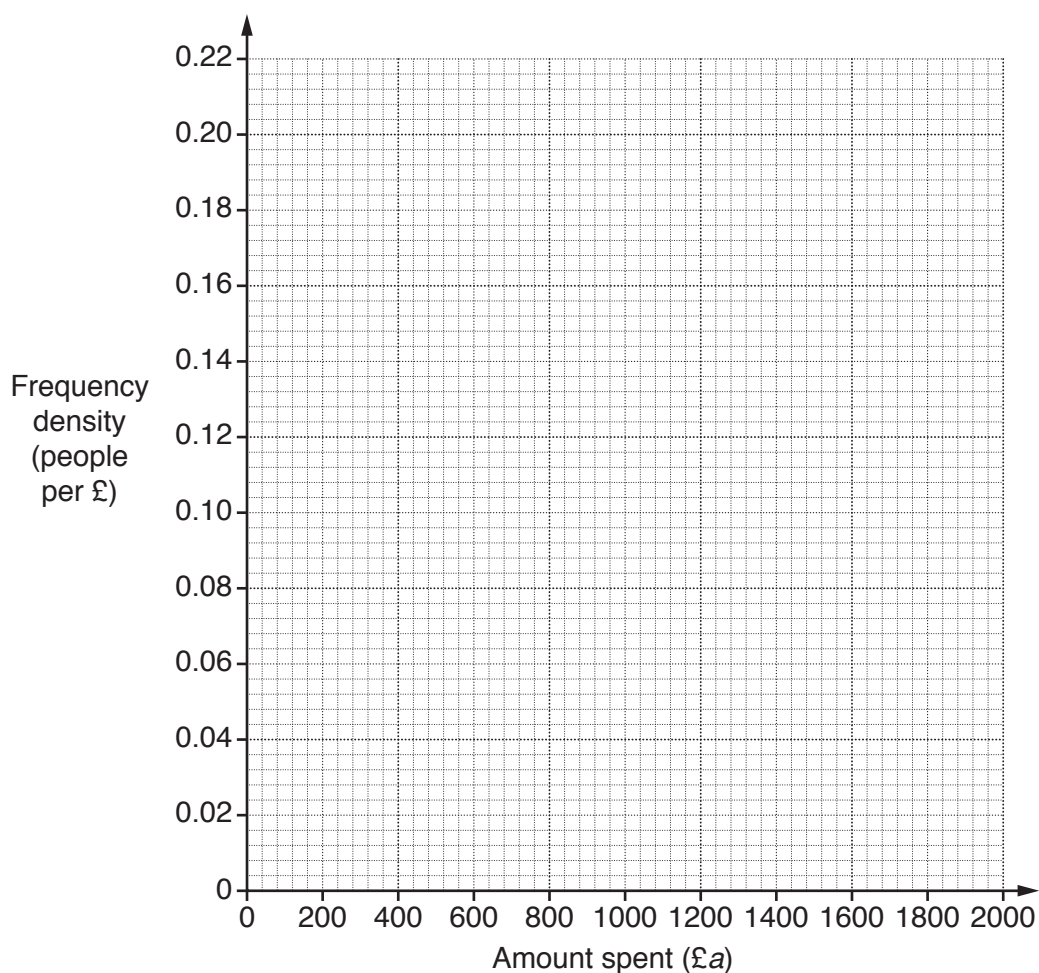
## 12

9 A travel agent did a survey about the amount spent per person on a week's holiday.

(a) This table summarises the amount spent on travel and accommodation.

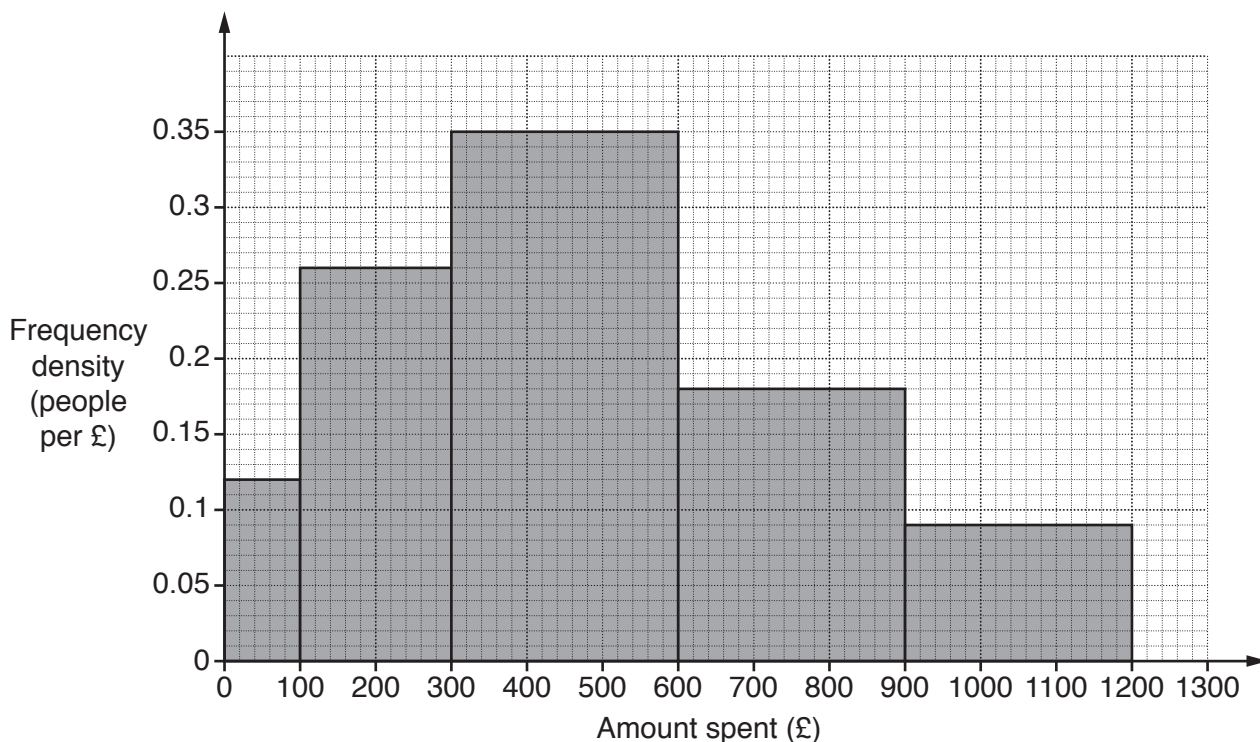
Amount spent (£ $a$ )	Frequency
$0 \leq a \leq 100$	12
$100 < a \leq 300$	40
$300 < a \leq 500$	36
$500 < a \leq 1000$	86
$1000 < a \leq 1500$	66
$1500 < a \leq 2000$	10

Draw a histogram to represent this information.



[3]

(b) This histogram represents the amount spent on food, drink and entertainment.



How many people spent from £600 to £900 on food, drink and entertainment?

(b) ..... [1]

(c) The travel agent totalled the amounts spent by each person on travel and accommodation and on food, drink and entertainment to work out their total spending on a holiday. The travel agent said

The person who spent most on their holiday spent £3100 altogether.

Explain how this is possible, given the data in parts (a) and (b).

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

14

10 (a) Rearrange this formula to make  $a$  the subject.

$$5(a + b) = 2ab$$

(a) ..... [4]

15

(b) You are given that  $f(x) = 2x - 5$ .

(i) Find  $f(3.5)$ .

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

(ii) Express  $f(3x + 4)$  in the form  $ax + b$ .

(ii) ..... [2]

**END OF QUESTION PAPER**

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