

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



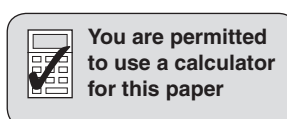
Candidate forename		Candidate surname	
Centre number		Candidate number	

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.

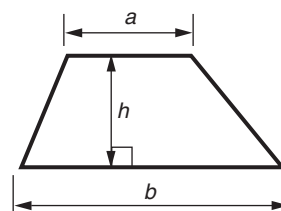
INFORMATION FOR CANDIDATES

- 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.

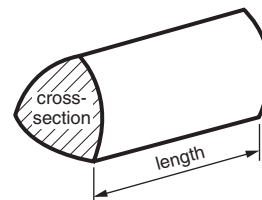


Formulae Sheet: Higher Tier

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



Volume of prism $= (\text{area of cross-section}) \times \text{length}$

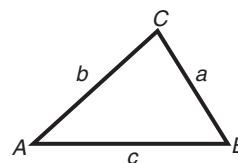


In any triangle ABC

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

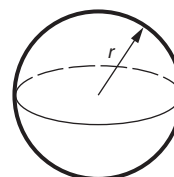
Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$

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



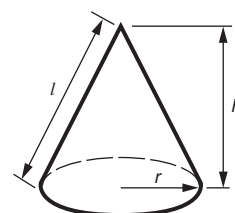
Volume of sphere $= \frac{4}{3} \pi r^3$

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 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]

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]

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

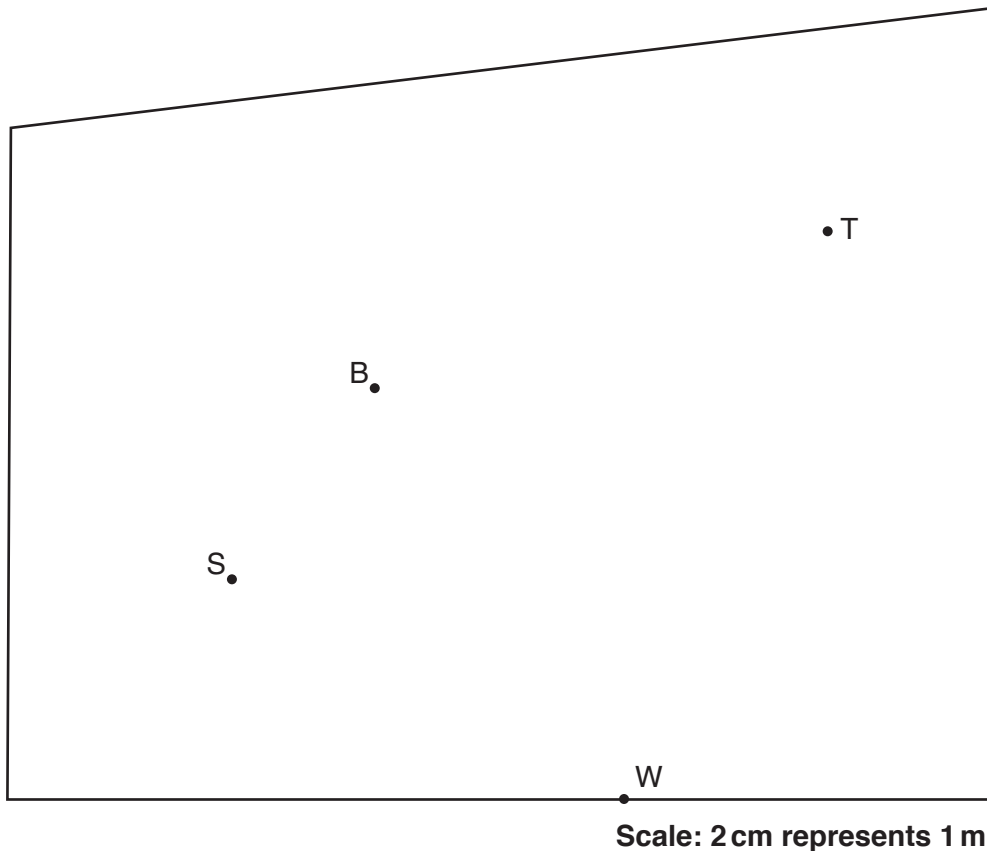
(b)(i) [4]

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

(ii) [3]

- 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]

- 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]

- (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.

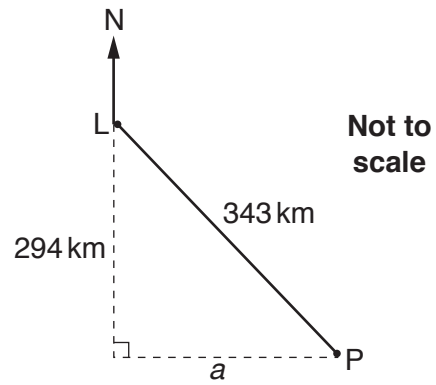
Advantage:

.....

Disadvantage:

..... [2]

- 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.

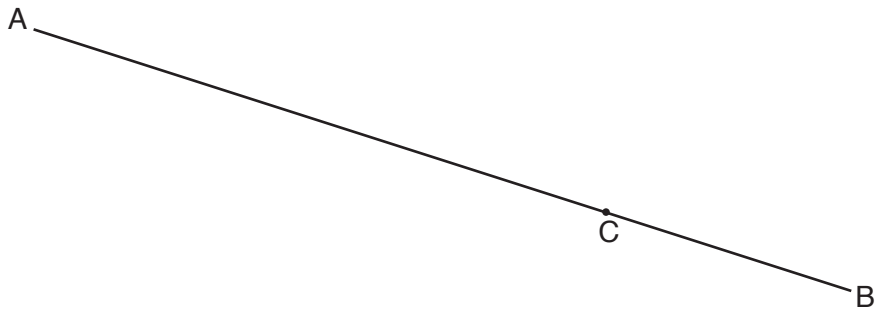
(a)km [3]

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

(b)° [4]

- 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.



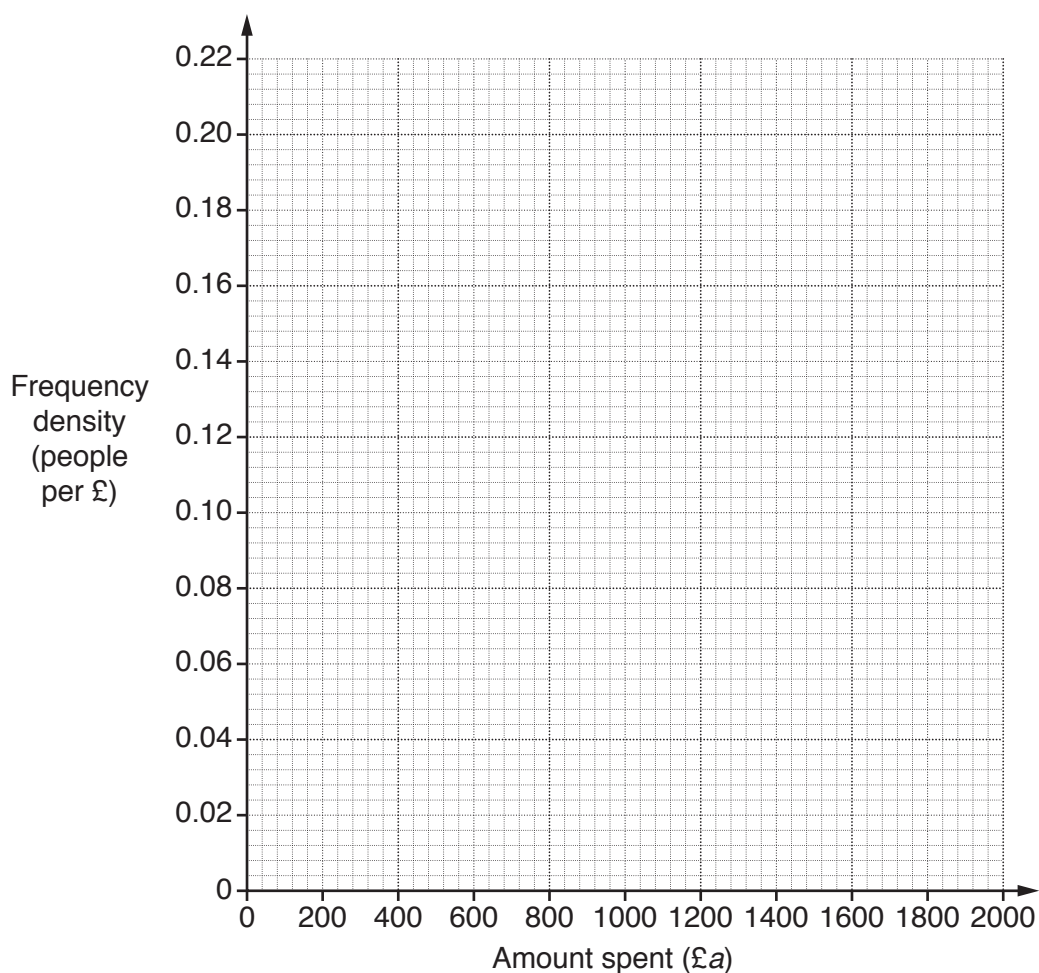
[2]

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.

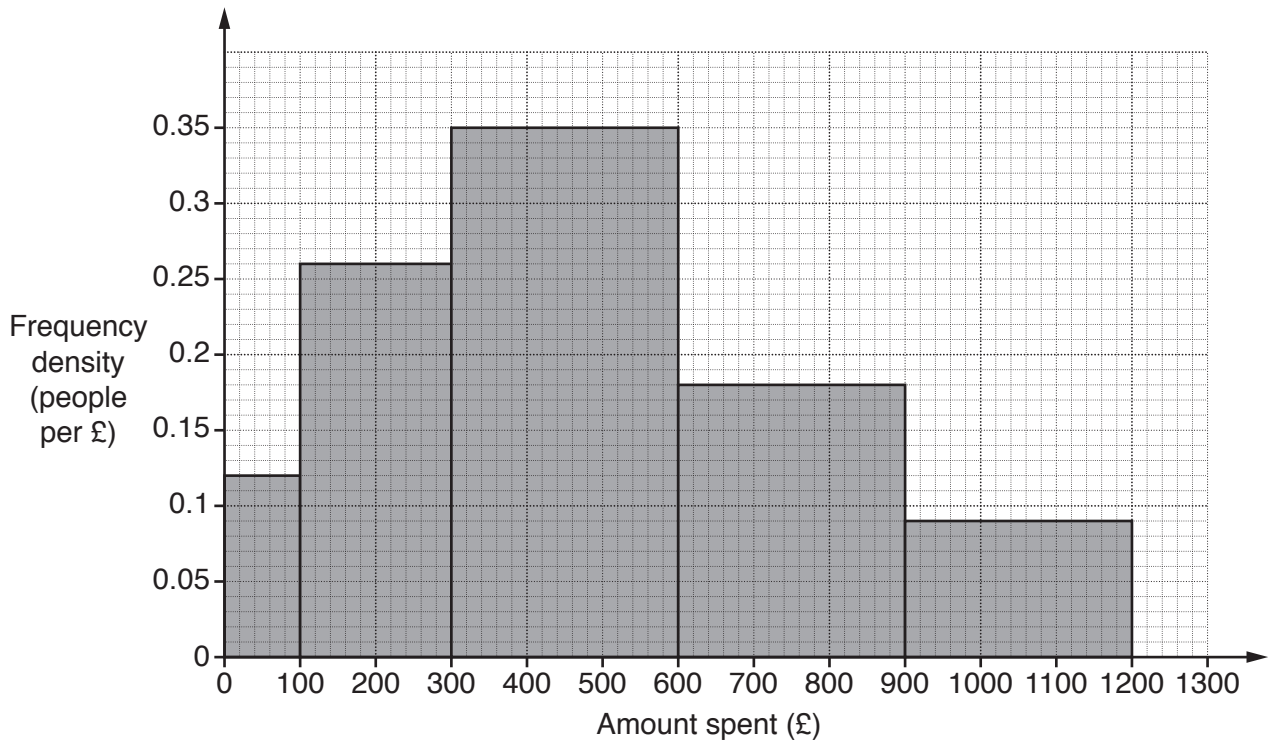
Amount spent (£ a)	Frequency
$0 \leq a \leq 100$	12
$100 < a \leq 300$	40
$300 < a \leq 500$	36
$500 < a \leq 1000$	86
$1000 < a \leq 1500$	66
$1500 < a \leq 2000$	10

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]

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

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

(a) [4]

(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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