AQA

Please write clearly in block capitals.

Centre number | | | | | | Candidate number | | | | |

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

Level 3 Certificate
MATHEMATICAL STUDIES

Paper 1

Time allowed: 1 hour 30 minutes

Materials

For this paper you must have:
- a clean copy of the Preliminary Material and Formulae Sheet (enclosed)
- a scientific calculator or a graphics calculator
- a ruler.

Instructions
- Use black ink or black ball-point pen. Pencil should only be used for drawing.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer each question in the space provided. Do not write outside the box around each page or on blank pages.
- If you need extra space for your answer(s), use the lined pages at the end of this book. Write the question number against your answer(s).
- Show all necessary working; otherwise marks for method may be lost.
- Do all rough work in this book. Cross through any work you do not want to be marked.
- The **final** answer to questions should be given to an appropriate degree of accuracy.
- You may **not** refer to the copy of the Preliminary Material that was available prior to this examination. A clean copy is enclosed for your use.

Information
- The marks for questions are shown in brackets.
- The maximum mark for this paper is 60.
- You may ask for more answer paper or graph paper, which must be tagged securely to this answer booklet.

For Examiner's Use	
Question	Mark
1	
2	
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4	
5	
6	
7	
8	
9	
10	
TOTAL	

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Answer **all** questions in the spaces provided.

1 Ismail records the animals he sees on a safari.

Which word does **not** describe the type of data he collects?

Circle your answer.

[1 mark]

qualitative raw continuous primary

1

2 (a) James and Kia are doing a survey about how people travel to work.

James asks 10 people at a bus stop one morning.

Kia asks 40 people, chosen at random, in the town centre every day for a week.

Make **two** comparisons of their methods of collecting data.

[2 marks]

Comparison 1

Comparison 2

Do not write outside the box

2 (b) Amy is also doing a survey about travel.

She collects this information about how teachers travel to her school.

Type of transport	Car	Bus	Walk
Number of teachers	84	36	10

Amy wants to ask some of the teachers more questions about travel.

She decides to ask a sample of 30 of these teachers, stratified by type of transport.

Work out how many teachers she should ask from each group.

[2 marks]

Car _____

Bus _____

Walk _____

4

Turn over for the next question

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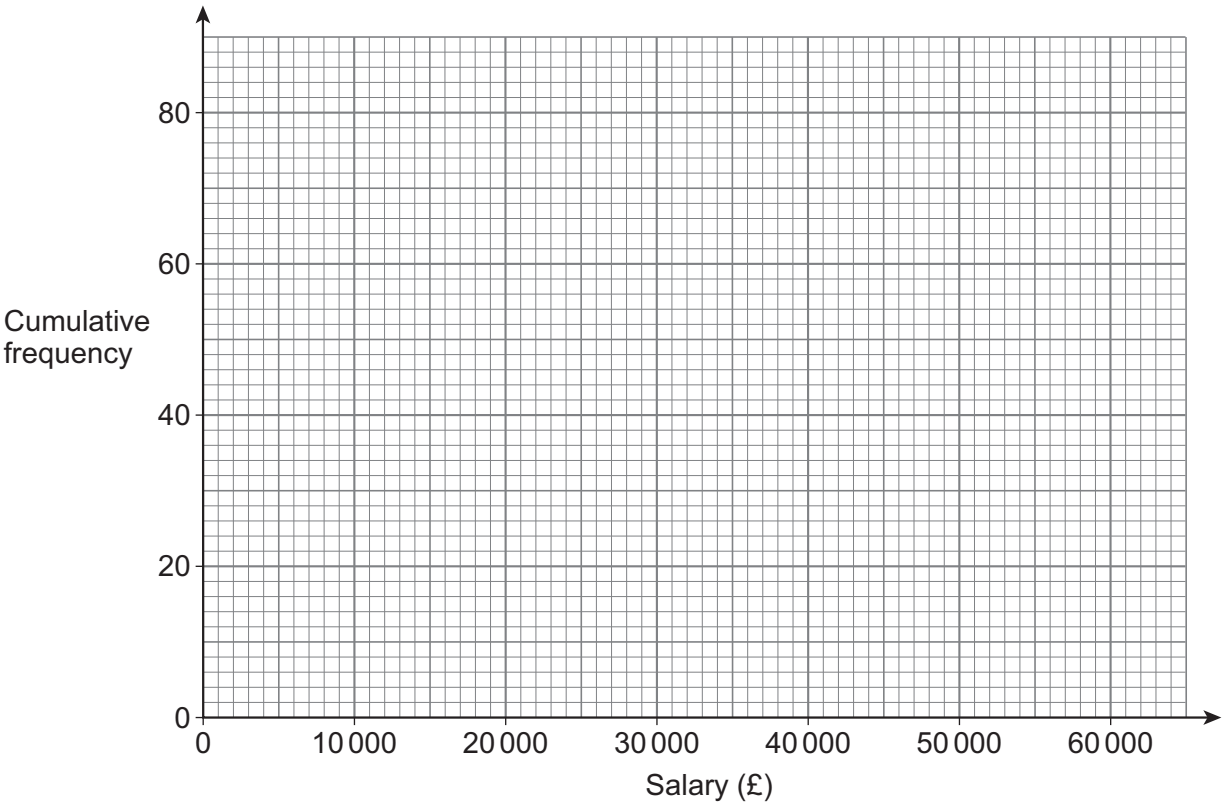
3 The table shows information about the annual salaries of 80 people working in sales in the UK.

Salary (£S)	Frequency	
$0 < S \leqslant 10\,000$	9	
$10\,000 < S \leqslant 20\,000$	36	
$20\,000 < S \leqslant 30\,000$	21	
$30\,000 < S \leqslant 40\,000$	8	
$40\,000 < S \leqslant 50\,000$	4	
$50\,000 < S \leqslant 60\,000$	2	

3 (a) On the grid, draw a cumulative frequency graph to show this information.

[3 marks]



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3 (b) Use your graph to estimate the value needed to complete the sentence below.

[2 marks]

_____

_____

20% of these people earn less than £ _____

3 (c) The average salary for all people working in sales in the UK is approximately £22 000

Estimate the percentage of these 80 people who earn **more than** the average salary.

[2 marks]

_____

_____

_____

Answer _____ %

7

Turn over for the next question

Do not write outside the box

4 Estimate the number of school meals served each year in a **large** secondary school.

State any assumptions you make.

You **must** show your working.

[5 marks]

Answer _____

5

5 Two groups of students take part in a long jump competition.

The stem-and-leaf diagram shows the distances jumped by group **A**.

	Key	5	1	represents 5.1 metres	
2	1	7	8		
3	0	2	5	6	
4	2	5	7	8	9
5	1	3	4		

Here is some information about the distances jumped by group **B**.

Median	3.9
Interquartile range (IQR)	1.7

Compare the performances of the two groups.

You **must** show your working.

[5 marks]

5

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6 Use **Student Loans** in the Preliminary Material.

Samir started a four-year course at university in 2016

On 1 September 2020 he started a job on an annual salary of £36 000

On that day he owed £23 700 to the Student Loan Company.

He knows that

- interest on his student loan is charged at the RPI + 1%
- he will receive a pay rise of £1000 after one year of work
- the threshold for student loans will stay the same.

Work out how much he will owe on 1 September 2022

Assume that

interest is added to the loan annually on 31 August **after** the full year of repayments has been deducted

and

the RPI stays the same for the two years.

[6 marks]

Do not write outside the box

Answer £ _____

6

Turn over for the next question

Do not write outside the box

7 Use **Building Plot** from the Preliminary Material.

A housing estate is to be built on a plot of land.

7 (a) The plot of land has an area of 20 hectares.

The **total** length of the roads on the estate will be between 800 m and 1200 m

At least 25% of the plot must be used for 2-bedroom houses.

The rest of the plot will be shared between 3-bedroom and 4-bedroom houses.

Estimate the **total** number of houses that will be built on the plot.

State any assumptions you make.

You **must** show your working.

[9 marks]

Do not write outside the box

Answer _____

7 (b) Explain **how** your answer may have been affected by an assumption you made.

[1 mark]

10

Turn over for the next question

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8 Use **Income Tax and National Insurance 2020–2021** from the Preliminary Material.

8 (a) Anna has an annual salary of £116 000

She has a reduced personal allowance as her salary is over £100 000

Work out her personal allowance.

[2 marks]

Answer £ _____

8 (b) Carlos has an annual salary of £165 000

He pays income tax and National Insurance but has no other deductions.

He says,

"I pay more than $\frac{2}{5}$ of my salary in income tax and National Insurance."

Is he correct?

You **must** show your working.

[9 marks]

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11

Turn over for the next question

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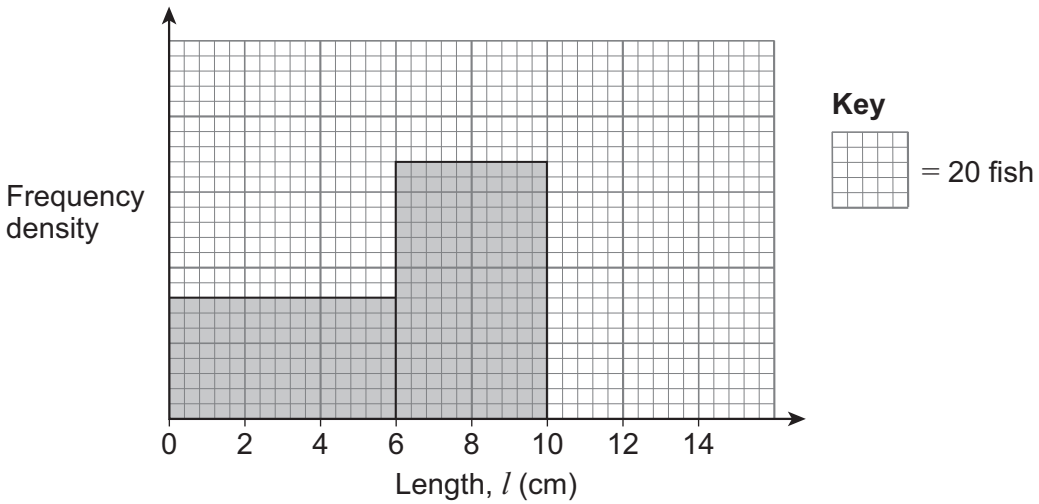
9 The histogram shows some information about the lengths, l cm, of fish sold in a month by a garden centre.



9 (a) Work out an estimate of the number of fish with lengths in the interval $4.5 < l \leqslant 10$

[4 marks]

Answer _____

Do not write outside the box

9 (b) The garden centre sold 96 fish with lengths in the interval $10 < l \leqslant 14$

Add this information to the histogram.

[2 marks]

6

Turn over for the next question

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10 Here is an advert for loans.

Eezy Loans
Loans up to £3000
APR 20.5%

Lucy wants a loan for £1200

She wants to pay back the loan in two equal instalments, with

the first instalment at the end of one year

and

the second instalment at the end of two years.

Work out the amount of each instalment.

Use the APR formula on the Formulae Sheet.

Give your answer to the nearest pound.

[5 marks]

Answer £ _____

5

END OF QUESTIONS

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ANSWER IN THE SPACES PROVIDED

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