AQA

Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

I declare this is my own work.

GCSE
STATISTICS

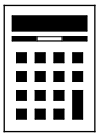
F

Foundation Tier Paper 2

Monday 17 June 2024 Afternoon Time allowed: 1 hour 45 minutes

Materials

For this paper you must have:
- a calculator
- mathematical instruments.



Instructions

- Use black ink or black ball-point pen. Draw diagrams in pencil.
- Fill in the boxes at the top of this page.
- Answer **all** questions.
- You must answer the questions in the spaces 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).
- Do all rough work in this book. Cross out any work you do not want to be marked.

Information

- The marks for questions are shown in brackets.
- The maximum mark for this paper is 80.
- You may ask for more answer paper and graph paper. These must be tagged securely to this answer booklet.

For Examiner's Use	
Question	Mark
1-4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
TOTAL	

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

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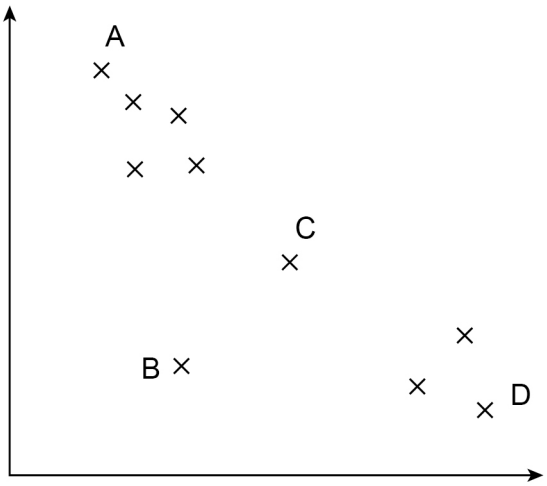
1 Here is a scatter diagram.

Four of the points have been labelled.



Which **one** of these points is an outlier?

Circle the letter of the outlier.

[1 mark]

A B C D

2 A fair, six-sided dice is rolled once.

Circle the probability of getting a 4

[1 mark]

$\frac{1}{6}$ $\frac{1}{2}$ $\frac{4}{6}$ 4

Do not write outside the box

3 Tick (✓) the example of qualitative data.

[1 mark]

The time it takes to complete a race ☐

The number of people who run a race ☐

The age of people who run a race ☐

The weather on race day ☐

4 Xian is investigating how many people in his office cycle to work.

Circle the term which best describes **all** the people who work in his office.

[1 mark]

Census Population Sample Survey

4

Turn over for the next question

Do not write outside the box

5 32 students were asked their favourite type of computer game.

Some of the results are shown.

Type of game	Tally	Frequency
Action		
Simulation	𝍸 | | | |	9
Real-Time Strategy	𝍸 𝍸 |	11
Role-playing		
Sport		
Other		

5 (a) Here are the rest of the results.

Role-playing	Other	Action	Role-playing
Role-playing	Role-playing	Action	Other
Other	Sport	Role-playing	Role-playing

Use these results to complete the table.

[3 marks]

5 (b) How many **more** students said Real-Time Strategy than Sport?

[1 mark]

Answer _____

Do not write outside the box

5 (c) Vicki says,

"In this sample Real-Time Strategy was **more than** twice as popular as Role-playing."

Comment on this conclusion.

[2 marks]

5 (d) One of the 32 students is picked at random.

The teacher says,

"The probability that this student's favourite type of game is Simulation is **more** than 0.25"

Is the teacher correct?

Tick (✓) a box.

Yes ☐ No ☐

You **must** give a reason for your answer.

[2 marks]

8

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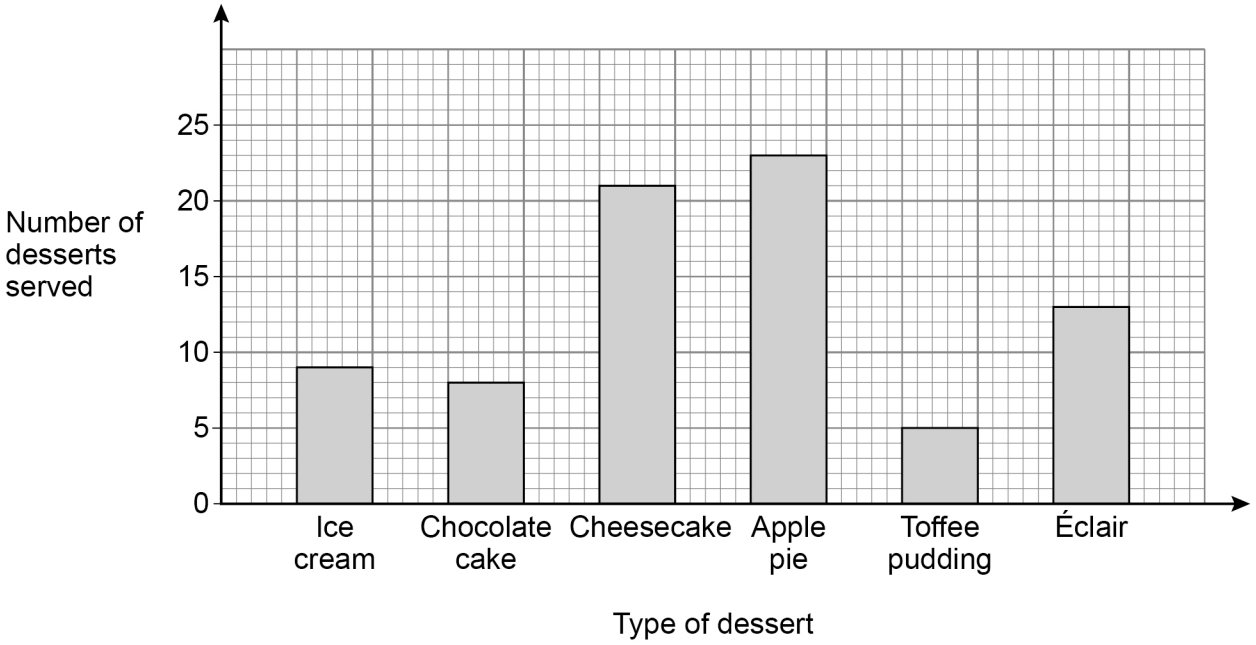
6 Iona works in a restaurant.

She records all the desserts that were served to customers on Saturday.

The bar chart shows information about the results.



6 (a) Which dessert was served more than any other?

[1 mark]

Answer _____

6 (b) The total of two of these desserts was the **same** as the number of cheesecakes served.

Write down the names of these two desserts.

[2 marks]

_____

_____

_____

_____

Answer _____ and _____

Do not write outside the box

6 (c) Iona says,

"The restaurant should stop serving toffee pudding as it is the least popular dessert."

Give a reason why she may **not** be correct.

[1 mark]

6 (d) (i) Iona writes a short survey that she will ask customers to complete after their meal.
Here is one of the questions,

"I'm sure you enjoyed our tasty desserts, didn't you?"

One criticism of the question is that it does not have a response section.

Write **one** different criticism of this question.

[1 mark]

6 (d) (ii) Another question in Iona's survey is,

"How many times have you been to this restaurant this year?"

Using all the tick boxes below, design a suitable response section for this question.

Do **not** add any more tick boxes.

[2 marks]

☐

☐

☐

☐

7

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7 (a) Students in a school can attend clubs after school.

Kai wants to find out which club is the most popular with Year 7 students.

He asks every 4th student on the list of Year 7 students which clubs they attend.

7 (a) (i) Name Kai's sampling method.

[1 mark]

Answer _____

7 (a) (ii) Give **two** advantages of Kai's sampling method.

[2 marks]

Advantage 1 _____

_____

_____

Advantage 2 _____

_____

_____

Do not write outside the box

7 (b) Kai asked 45 Year 7 students which clubs they attend.

The table shows his data.

Club	Rugby	Tennis	Computer	Other
Frequency	24	15	6	8

7 (b) (i) Give a reason why the total of the four frequencies is more than 45

[1 mark]

7 (b) (ii) Draw a pictogram to represent Kai's data.

[3 marks]

Key  represents 4 students

7

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ANSWER IN THE SPACES PROVIDED

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8 Yamil is the manager at a zoo.

He wants to find out more information about the visitors.

He asks every visitor on Monday to complete a questionnaire after their visit.

8 (a) (i) Write down **one** possible problem with Yamil's data collection method.

Give a solution to the problem.

[2 marks]

Problem _____

_____

Solution _____

_____

_____

8 (a) (ii) Write down a **different** possible problem with Yamil's data collection method.

You do **not** need to give a solution to the problem.

[1 mark]

Problem _____

_____

Question 8 continues on the next page

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8 (b) One of Yamil's questions in the questionnaire was,

"How many hours did you stay at the zoo today?"

The tables show some information about the results.

Hours at the zoo, h	**Frequency**
$0 < h \leqslant 2$	50
$2 < h \leqslant 3$	110
$3 < h \leqslant 4$	215
$4 < h \leqslant 5$	
$5 < h \leqslant 6$	25
$6 < h \leqslant 7$	10

Hours at the zoo, h	**Cumulative frequency**
$h \leqslant 2$	50
$h \leqslant 3$	160
$h \leqslant 4$	375
$h \leqslant 5$	465
$h \leqslant 6$	490
$h \leqslant 7$	

8 (b) (i) Complete the tables by filling in the **two** empty cells.

[2 marks]

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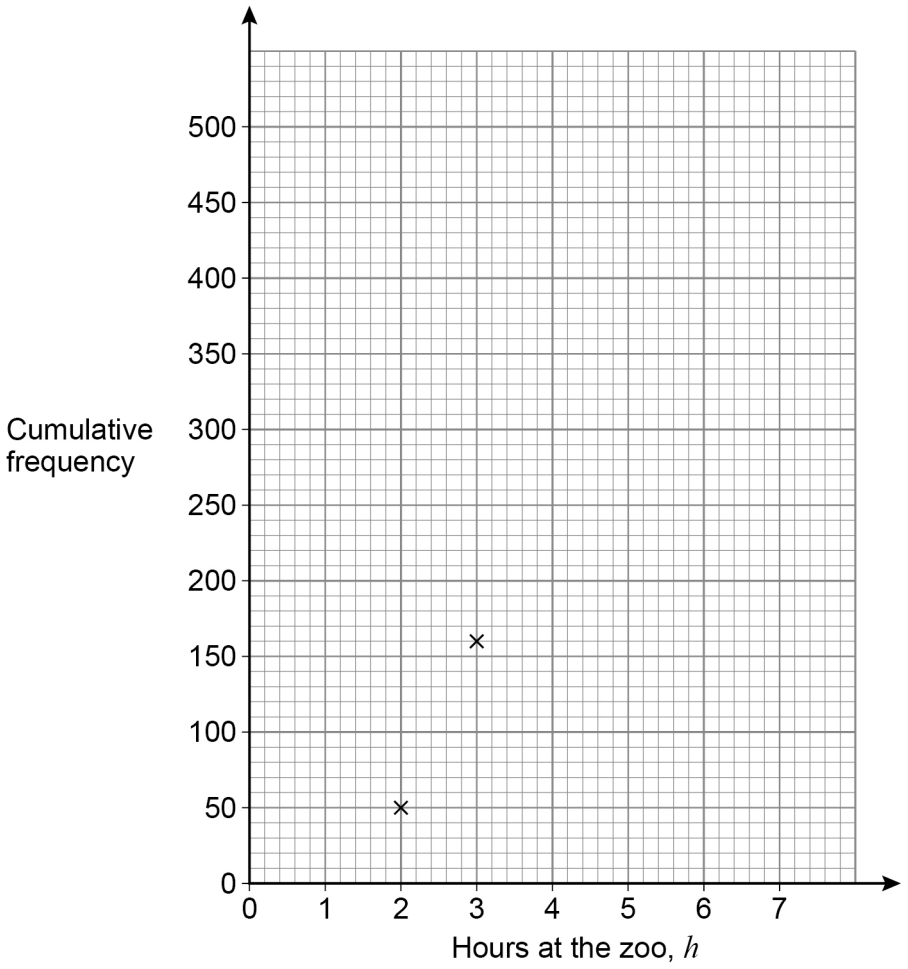
8 (b) (ii) Complete the cumulative frequency diagram for the data.

[3 marks]



8 (b) (iii) Use the cumulative frequency diagram to work out an estimate of how many visitors stayed at the zoo between $2\frac{1}{2}$ and 5 hours.

[2 marks]

Answer _____

8 (b) (iv) Use your cumulative frequency diagram to work out an estimate of the 50th percentile.

[2 marks]

Answer _____ hours

Turn over ►

Do not write outside the box

8 (c) Yamil also wants to investigate how much money the visitors spend in the restaurant.

He **does not** ask the visitors.

Write down **one** way he could get this data.

[1 mark]

8 (d) Yamil has data for the number of visitors to the zoo and how much was spent in the gift shop, for each day in July.

The Spearman's rank correlation coefficient for the number of visitors and the total amount of money spent in the gift shop is 0.82

Write a conclusion in context.

[1 mark]

14

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ANSWER IN THE SPACES PROVIDED

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9 (a) Ragnar wants to know if the age of a person is related to the number of apps on their phone.

Circle the response variable.

[1 mark]

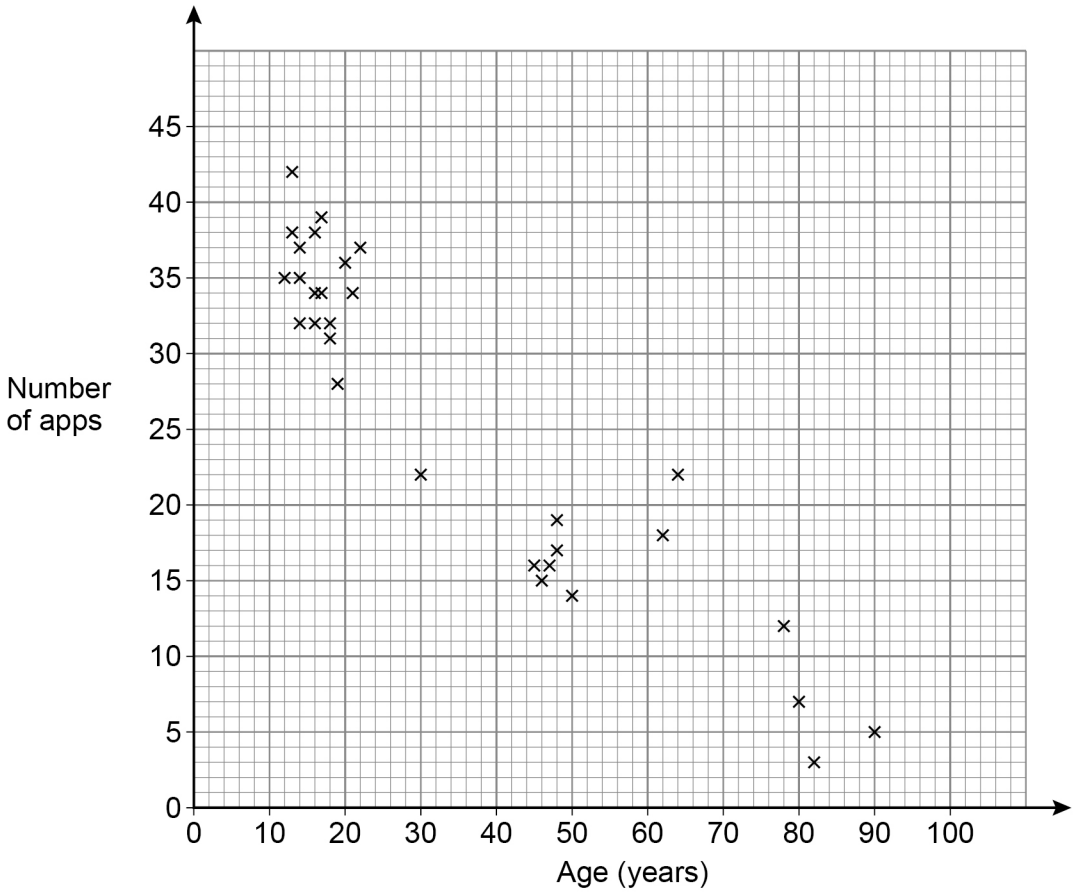
The age of the person

The model of phone

The number of apps on the phone

The number of people asked

9 (b) Ragnar draws this scatter diagram to show his data.



Give **one** criticism of Ragnar's data set.

[1 mark]

Do not write outside the box

9 (c) Ragnar works out

- the mean age is 35 years
- the mean number of apps is 26

Use this information to draw a line of best fit on the scatter diagram.

[2 marks]

9 (d) Tick (✓) a box to describe any correlation in the data.

[1 mark]

☐ Positive correlation ☐ Negative correlation ☐ No correlation

9 (e) Estimate how many apps a 70-year-old person has on their phone.

[1 mark]

Answer _____

6

Turn over for the next question

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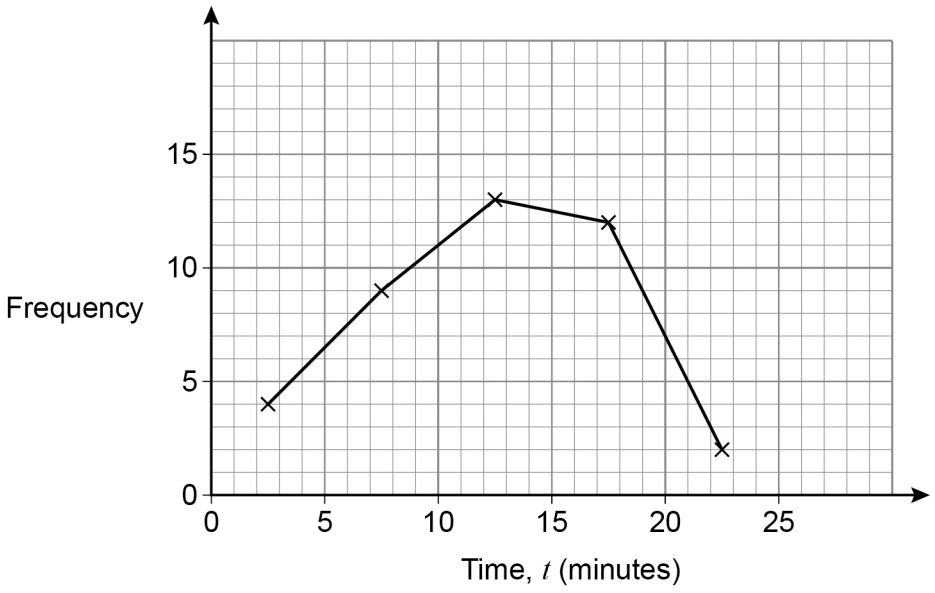
10 A group of people take a test for a new job.

The frequency polygon shows information about the time each person takes to complete the test.



10 (a) Circle the time interval that has a frequency of 9

[1 mark]

$0 < t \leqslant 5$ $5 < t \leqslant 10$ $10 < t \leqslant 15$ $15 < t \leqslant 20$

10 (b) How many people complete the test?

[2 marks]

Answer _____

Do not write outside the box

10 (c) Calculate an estimate for the mean time it takes to complete the test.

[3 marks]

Answer _____ minutes

10 (d) Why is your answer to Question **10 (c)** only an estimate?

[1 mark]

7

Turn over for the next question

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11 The table shows the price of 1 gram of gold at the start of each year from 2019 to 2022.

Year	2019	2020	2021	2022
Price (£)	32.71	38.08	45.37	43.07

Source: gold.co.uk

11 (a) Using 2019 as the base year, show that the index number for 2022 is 131.7 to 1 decimal place.

[2 marks]

11 (b) Here is a statement,

'With 2019 as the base year, for every year in the future, the index number **must** be greater than 100'

Do you agree with this statement?

Tick (✓) a box.

Yes ☐ No ☐

Give a reason for your answer.

[1 mark]

3

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Turn over for the next question

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12 Sita is investigating the fuel type of new cars sold in the UK in 2019 and 2021.

She finds this information about 2019.

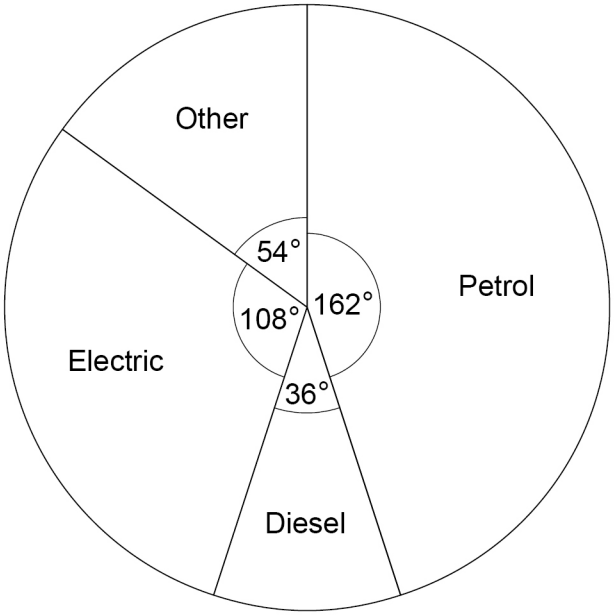
Fuel type	Number of new cars sold in the UK in 2019
Petrol	1 478 400
Diesel	577 500
Electric	184 800
Other	69 300

Adapted from Statista and msn.com

In 2021 there were a total of 1 650 000 new cars sold in the UK.

Sita finds this pie chart about 2021.

Fuel type of new cars sold in the UK in 2021



Source: Adapted from Statista and msn.com

Do not write outside the box

Compare the number of new cars of each fuel type sold in 2019 with those sold in 2021.

In your answer you **must** give

- calculations for the number of new cars of each fuel type sold in 2021
- comparisons with 2019.

[7 marks]

7

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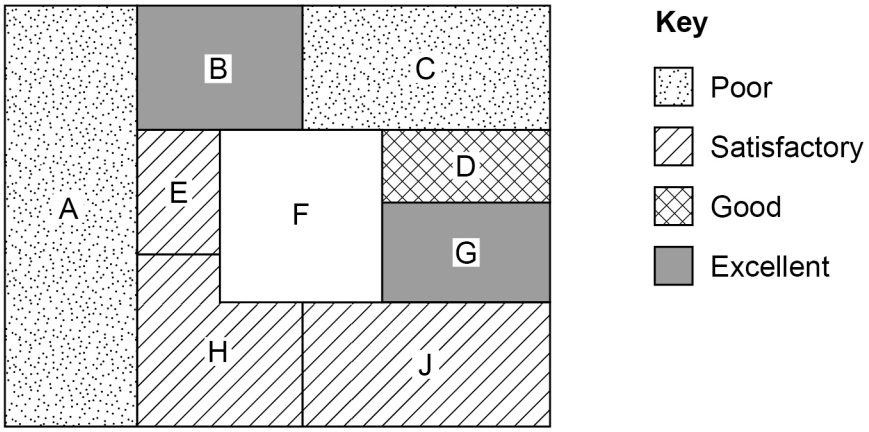
13 A farmer rates how well crops grow in her nine fields.

The choropleth map represents the fields on her farm and some of her ratings.



13 (a) The farmer has the same number of fields rated good as are rated excellent.

Complete field F on the choropleth map.

[1 mark]

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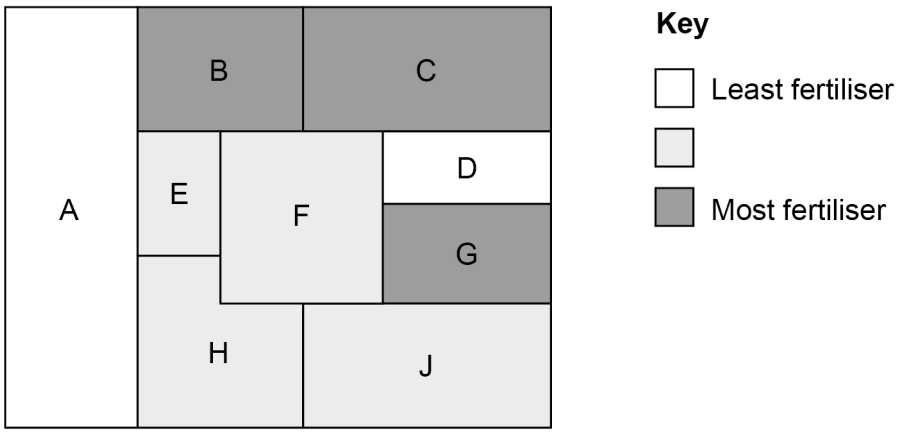
13 (b) Here is a different choropleth map of the same nine fields.

This map shows the amount of fertiliser the farmer used on each field.



The farmer makes the conclusion,

"The fields that had more fertiliser produced better quality crops."

Comment on her conclusion by comparing the **two** choropleth maps.

You should give a reason for and a reason against her conclusion.

[2 marks]

Reason for _____

_____

_____

_____

_____

Reason against _____

_____

_____

_____

_____

Question 13 continues on the next page

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13 (c) Give **one** way the farmer could gain a greater amount of detail from the choropleth maps.

[1 mark]

13 (d) Write down **one** possible extraneous variable.

[1 mark]

5

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14 A type of fraud is when money is taken from you without your permission.

Money can be taken from your bank account, when shopping, or in other ways.

These frauds can take place online or offline.

The table shows data, in thousands, about some of these frauds that took place in 2020–2021.

	Bank account	**Shopping**	**Other**	**Total**
Online	809	853	240	**1902**
Offline	1073	116	181	**1370**
Total	**1882**	**969**	**421**	**3272**

Adapted from ONS

One of these frauds is selected at random.

14 (a) Write down the probability that it happened online.

[1 mark]

Answer _____

14 (b) Work out the probability that the fraud was **not** a bank account fraud.

[2 marks]

_____

_____

Answer _____

14 (c) Work out the probability that it was a shopping fraud given that it happened offline.

[2 marks]

_____

_____

_____

Answer _____

5

Turn over ►

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15 Arne has produced a new fitness app.

He records the number of downloads per week, for 8 consecutive weeks.

Week	1	2	3	4	5	6	7	8
Downloads	500	520	580	600	680	720	600	840

15 (a) Arne says,

"520 people used the app in week 2."

Is he correct?

Tick (✓) a box.

Yes ☐ No ☐ Cannot tell ☐

Give a reason for your answer.

[1 mark]

15 (b) Here are the data again, with some 4-point moving averages completed.

Week	1	2	3	4	5	6	7	8
Downloads	500	520	580	600	680	720	600	840
Moving Average		550	595	645	650			

Complete the table by calculating the missing 4-point moving average.

[2 marks]

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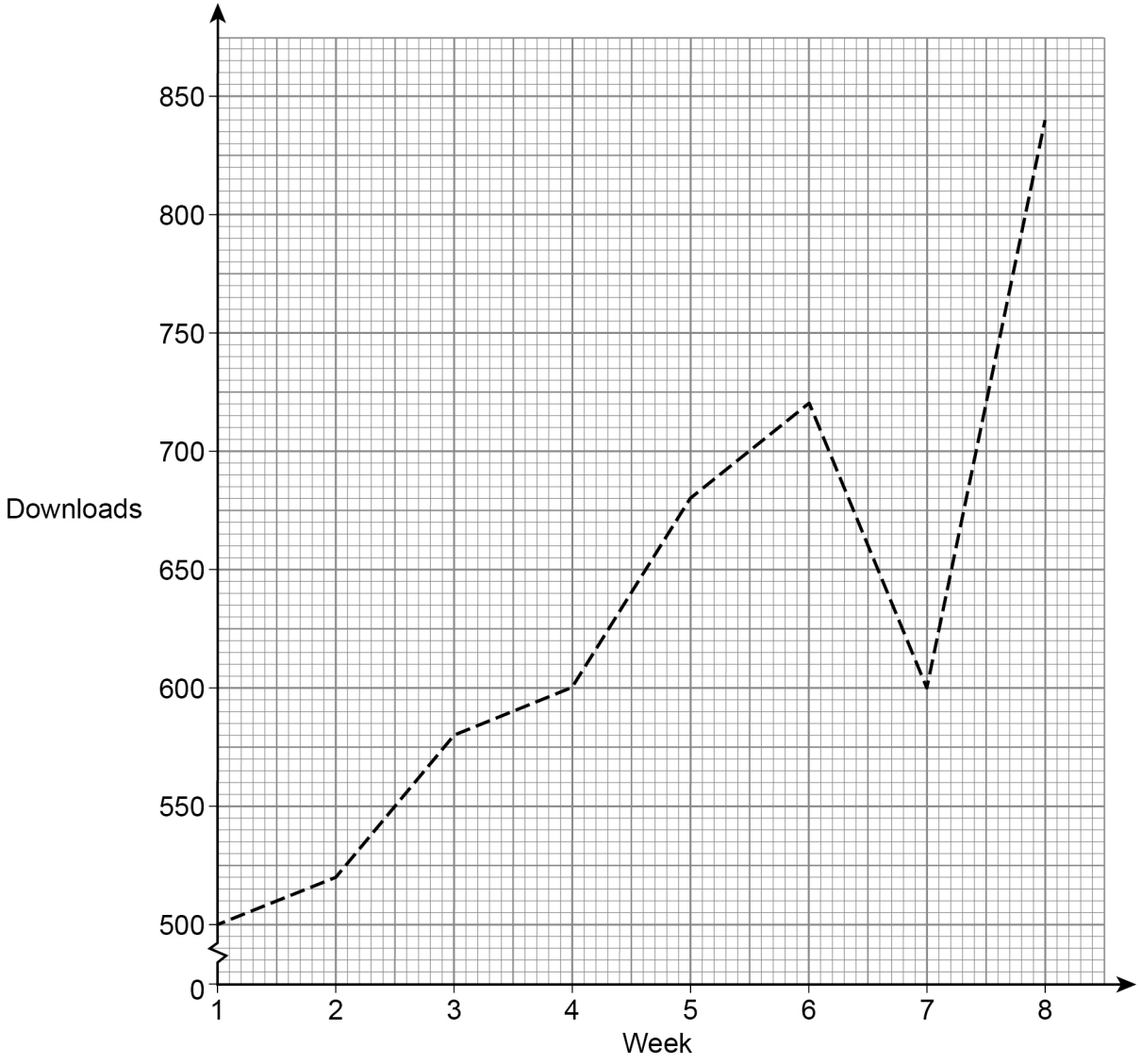
15 (c) The time series graph shows the data for the 8 weeks.

Plot the 4-point moving averages **and** draw the trend line.

[3 marks]



15 (d) Describe the trend, in context.

[1 mark]

7

END OF QUESTIONS

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