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 1

Monday 12 June 2023 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	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
TOTAL	

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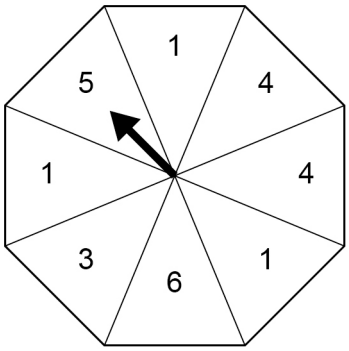
Answer **all** questions in the spaces provided.

1 Here is a fair spinner.



It is spun once.

What is the probability that it lands on a 1?

Circle your answer.

[1 mark]

$\frac{3}{8}$ $\frac{1}{5}$ $\frac{3}{5}$ $\frac{1}{8}$

1

2 Here are some data.

warm warm hot cold cold warm

hot hot warm cold hot warm

2 (a) Circle the word that best describes this type of data.

[1 mark]

quantitative continuous discrete qualitative

2 (b) Which of these diagrams would **not** be suitable to represent these data?

Circle your answer.

[1 mark]

pie chart bar chart stem-and-leaf pictogram

2

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3 **A**, **B**, **C** and **D** are scatter diagrams.

Diagram A

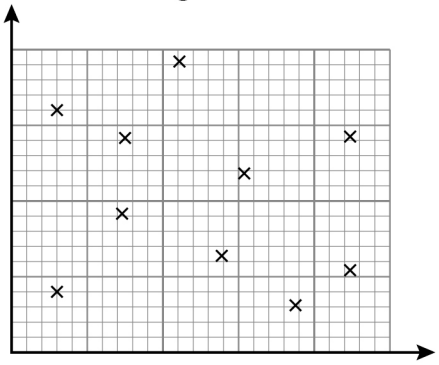


Diagram B

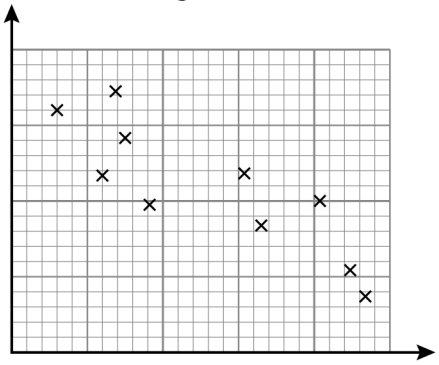


Diagram C

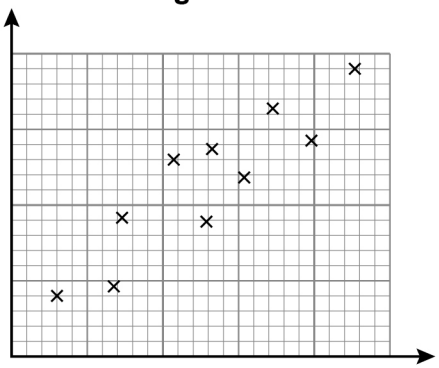
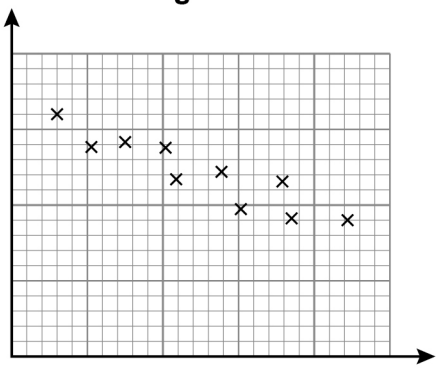


Diagram D



Which diagram shows **positive** correlation?

Circle your answer.

[1 mark]

A **B** **C** **D**

1

Turn over for the next question

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4 Mrs Banik wants to investigate how many hairstyling products students in her school use. She asks her Year 7 PE class.

4 (a) Suggest **one** way that Mrs Banik could improve her method for collecting the data.

[1 mark]

_____

_____

_____

4 (b) The table shows her results.

Number of hairstyling products used each day	0	1	2	3	4
Frequency	7	12	6	5	2

4 (b) (i) Write down the mode for the number of hairstyling products used each day.

[1 mark]

Answer _____

4 (b) (ii) What fraction of the class used **more than** 1 hairstyling product each day?

[2 marks]

_____

_____

_____

Answer _____

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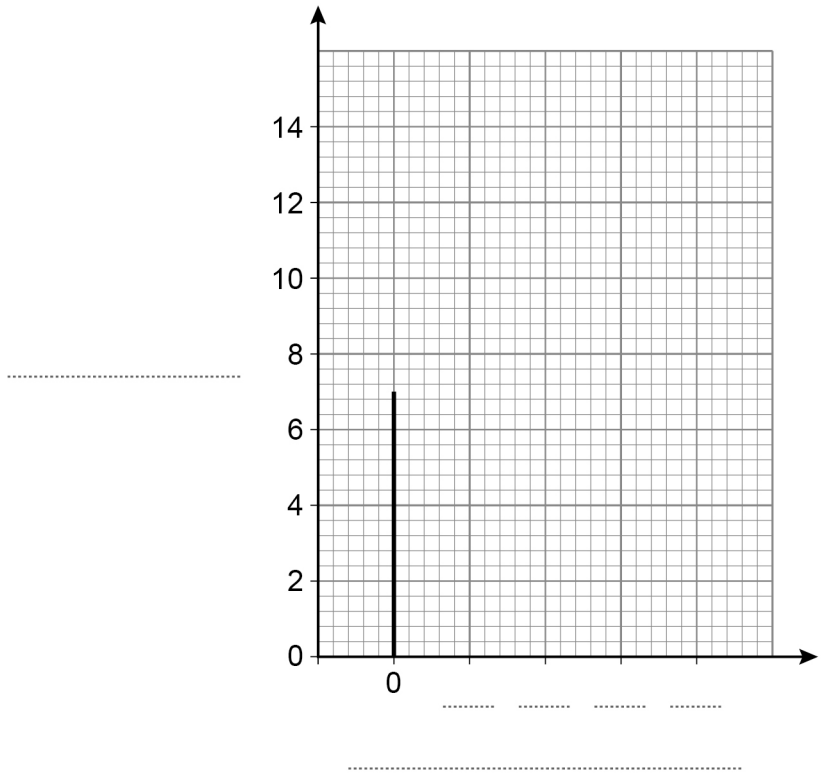
4 (b) (iii) Complete the bar line graph to show these results.

Remember to complete the labels.

[4 marks]



8

Turn over for the next question

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5 Pria owns a café.

She wants to begin offering soup at lunchtime.

Pria collects information about her customers' favourite soup.

The table shows her results.

Favourite soup	**Number of customers**
Vegetable	12
Chicken	18
Tomato	20
Mushroom	8
Other	3

5 (a) Write down **two** conclusions from Pria's results.

[2 marks]

Conclusion 1 _____

_____

_____

Conclusion 2 _____

_____

_____

Do not write outside the box

5 (b) Complete the pictogram, including the key, to show Pria's results.

[4 marks]

Key ◯ represents ..... customers

Vegetable	
Chicken	
Tomato	◯ ◯ ◯ ◯ ◯
Mushroom	
Other	

5 (c) Pria wants to know how often her customers eat soup for lunch.
She produces this questionnaire.

How often do you eat soup?

☐ 1–2 times ☐ 2–3 times ☐ 4–5 times ☐ more than 5 times

5 (c) (i) Write down **one** problem with the question.

[1 mark]

_____

_____

5 (c) (ii) Write down **two** problems with the response section.

[2 marks]

1 _____

_____

2 _____

_____

Question 5 continues on the next page

Do not write outside the box

Pria designs a more suitable questionnaire.

She gives it to the first 25 customers who enter her café for lunch one day.

5 (d) (i) Name this sampling method.

[1 mark]

Answer _____

5 (d) (ii) Give **one** advantage of this sampling method.

[1 mark]

_____

_____

5 (d) (iii) Give **one** disadvantage of this sampling method.

[1 mark]

_____

_____

12

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6 Nik wants to increase the number of subscribers to his online video channel.
He sets up a prize draw for people who share his channel on social media.
Nik thinks this will increase his number of subscribers.

6 (a) His hypothesis is,

"Will more people subscribe to my channel?"

6 (a) (i) Give a reason why this is **not** a hypothesis.

[1 mark]

_____

_____

6 (a) (ii) Write an appropriate hypothesis that Nik could use.

[1 mark]

_____

_____

_____

Question 6 continues on the next page

Do not write outside the box

These data show the number of new subscribers to Nik's channel for the first 14 days after the prize draw was set up.

170	400	1300	600	2400	1300	1300
3800	2400	4100	4100	3500	18 800	4300

6 (b) Nik's friend says,

"On average, the daily number of new subscribers during the 14 days is **more than** 3000"

Nik comments,

"It depends on which average you use."

Is Nik correct?

You **must** show your working.

[4 marks]

Do not write outside the box

6 (c) (i) Give a reason why 18 800 appears to be an outlier.

[1 mark]

6 (c) (ii) Nik believes that 18 800 **must** have been incorrectly recorded.

Suggest a possible reason why he might be wrong.

[1 mark]

6 (c) (iii) Nik cleans his data by removing the value 18 800

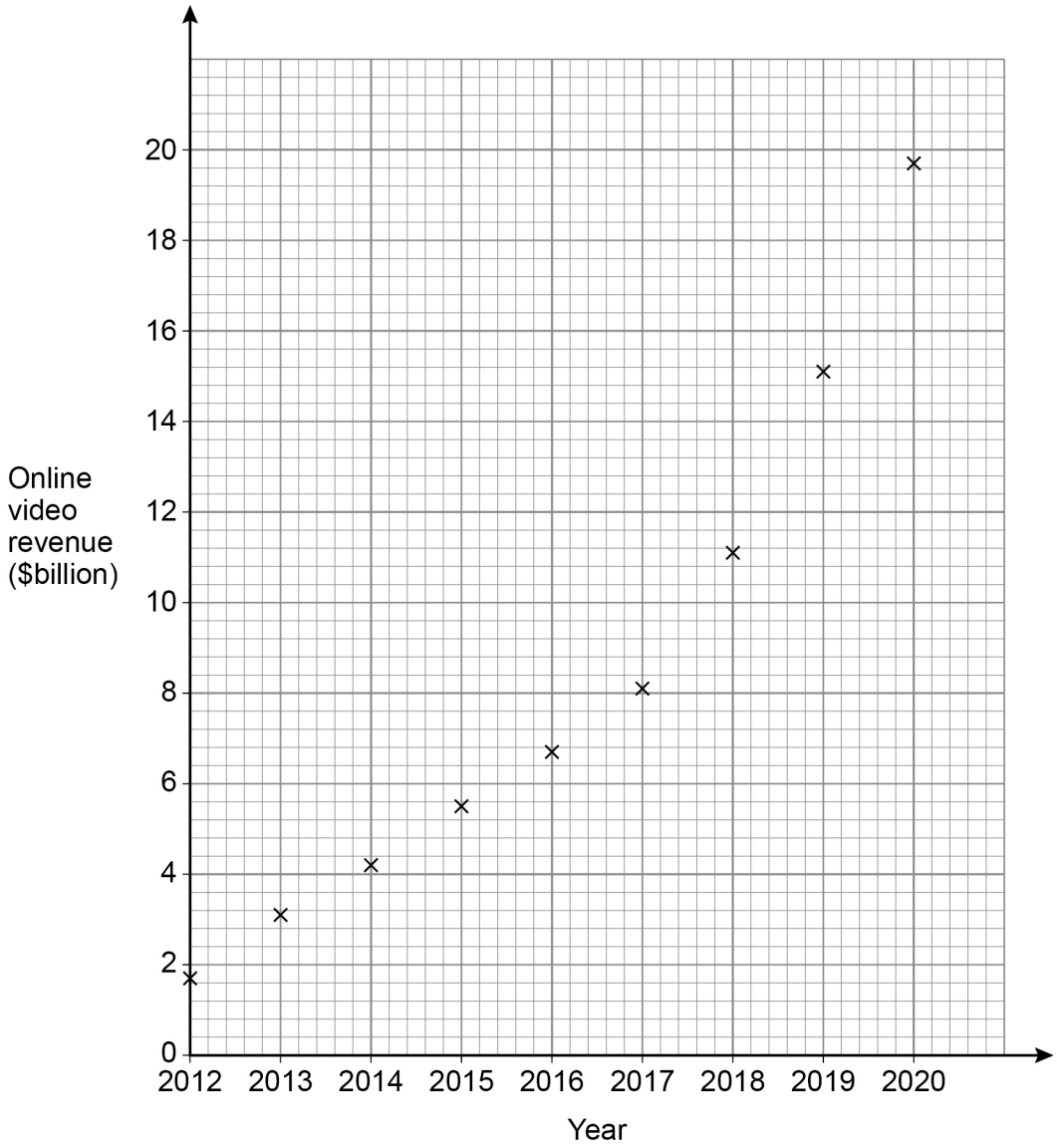
Without doing any further calculations, explain how this will change each of the averages you calculated in **part (b)**.

[2 marks]

Question 6 continues on the next page

Do not write outside the box

6 (d) Nik sees this graph on a website.



Source: businessofapps.com

Do not write outside the box

Comment, with a reason, whether the graph shows that,

6 (d) (i) online video revenue increased by about $5 billion between 2013 and 2017,

[2 marks]

6 (d) (ii) more people watched online videos in 2020 than in 2019,

[1 mark]

6 (d) (iii) online video revenue in 2022 will be greater than $20 billion.

[1 mark]

14

Turn over for the next question

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ANSWER IN THE SPACES PROVIDED

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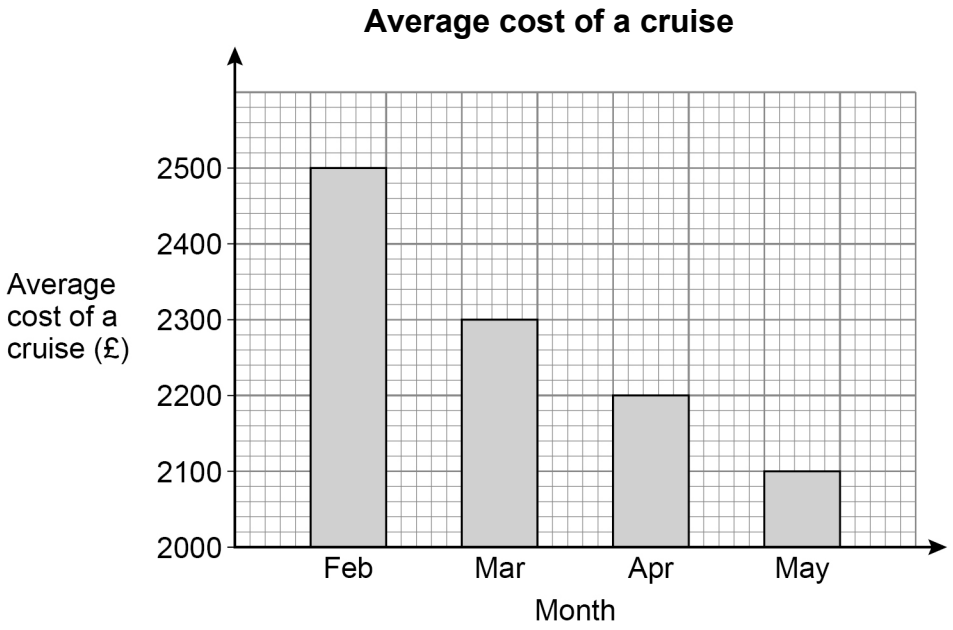
7 A travel company produced this graph to use in an advert.



7 (a) (i) Give a reason why this graph is misleading.

[1 mark]

_____

_____

7 (a) (ii) On the grid below, draw a graph that,

- shows the same information
- is **not** misleading.

[2 marks]

Turn over ►

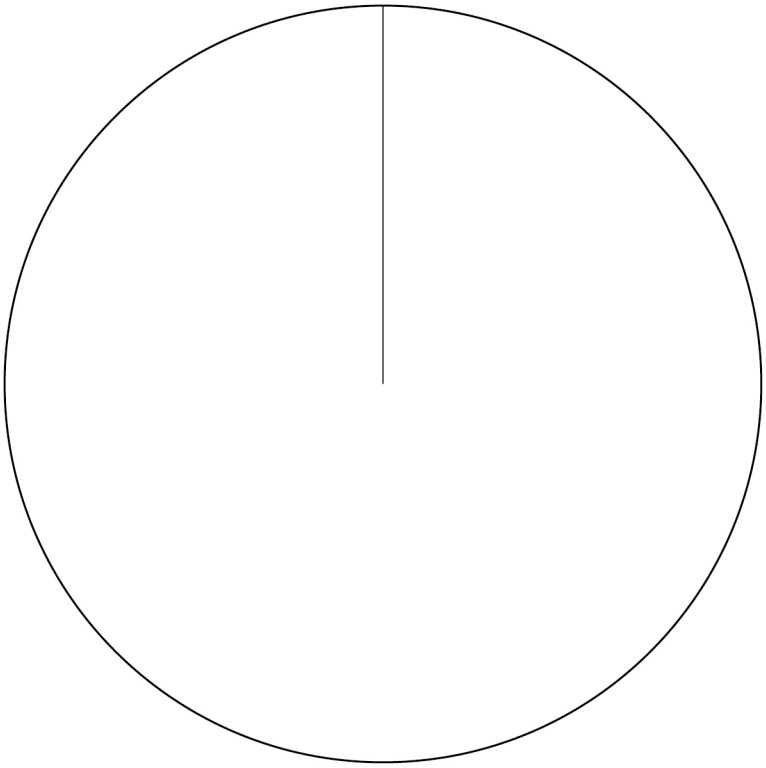
Do not write outside the box

7 (b) The table shows the number of each type of holiday the travel company sold last week.

Holiday type	Ski	Cruise	Beach	Adventure
Frequency	5	34	34	17

7 (b) (i) Draw a fully labelled pie chart to illustrate the data in the table.

[4 marks]



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7 (b) (ii) The travel company plan to use the pie chart on their social media page.

They want their customers to see,

the most popular holiday they sell

and

the number of holidays they sell.

Does the pie chart show this information?

Tick (✓) a box.

Yes ☐ No ☐

You must give a reason for your answer.

[1 mark]

_____

_____

_____

_____

7 (b) (iii) The travel company claim the information in the table shows that they will sell 5 ski holidays every week.

Why is this **not** a sensible claim?

[1 mark]

_____

_____

_____

9

Turn over for the next question

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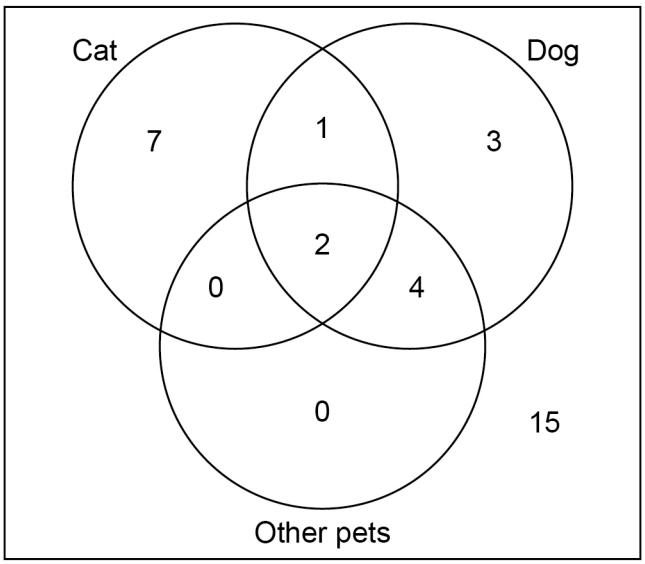
8 Rachael asked all her friends what types of pets they have.

The results are shown in the diagram.



8 (a) Rachael says,

"More of my friends have cats than have dogs."

Is Rachael correct?

Tick (✓) a box.

Yes ☐ No ☐

Show working to support your answer.

[2 marks]

Do not write outside the box

8 (b) Rachael chooses one of her friends at random.

Work out the probability that this friend has **at least** one type of pet.

[2 marks]

Answer _____

8 (c) Rachael now chooses at random one of her friends who has a cat.

Work out the probability that this friend **also** has a dog.

[2 marks]

Answer _____

6

Turn over for the next question

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9 The table shows Chan's annual salary from 2017 to 2020.

Year	Salary (£)	Salary index number
2017	21 000	100
2018	21 420	102
2019	22 890	109
2020	23 310	

9 (a) Using 2017 as the base year, calculate the salary index number for 2020.

Write your answer in the table above.

[2 marks]

9 (b) Using 2017 as the base year, the salary index number for the year 2021 is 116

Work out Chan's salary in 2021.

[2 marks]

Answer £ _____

4

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10 Mrs Kay teaches woodwork classes for small groups of students.

She takes a sample of 20 classes.

The table shows information about how many students attended the classes.

Number of students, x, in the class	**Number of classes**
1	1
2	3
3	5
4	9
5	2

10 (a) Complete the cumulative frequency table for these data.

[1 mark]

Number of students, x, in the class	**Cumulative frequency**
$x \leqslant 1$	1
$x \leqslant 2$	4
$x \leqslant 3$	
$x \leqslant 4$	
$x \leqslant 5$	

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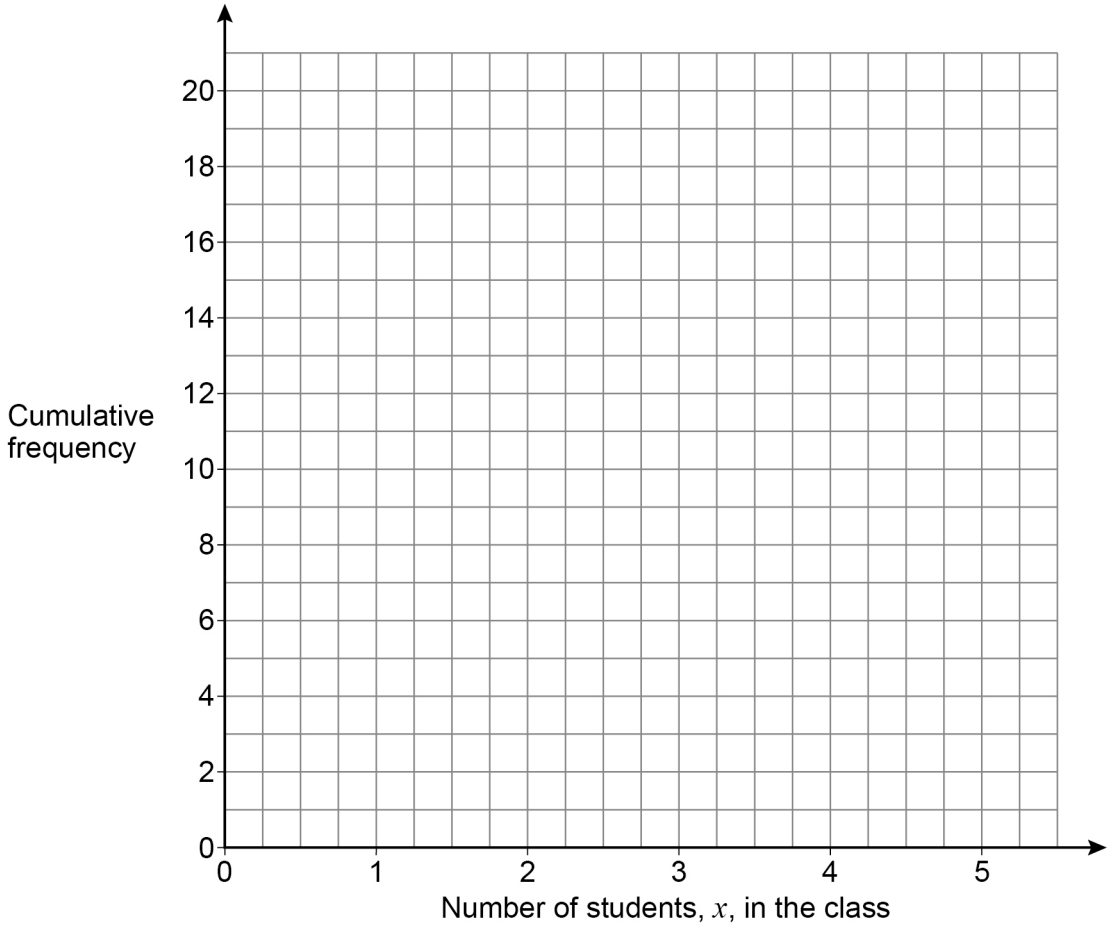
10 (b) Draw a cumulative frequency **step** polygon to represent the data.

[2 marks]



10 (c) Mrs Kay says,

"The median number of students in my classes is **more than** 3"

Is Mrs Kay correct?

Tick (✓) a box.

Yes ☐ No ☐

Give a reason for your answer.

[1 mark]

_____

_____

_____

4

Turn over ►

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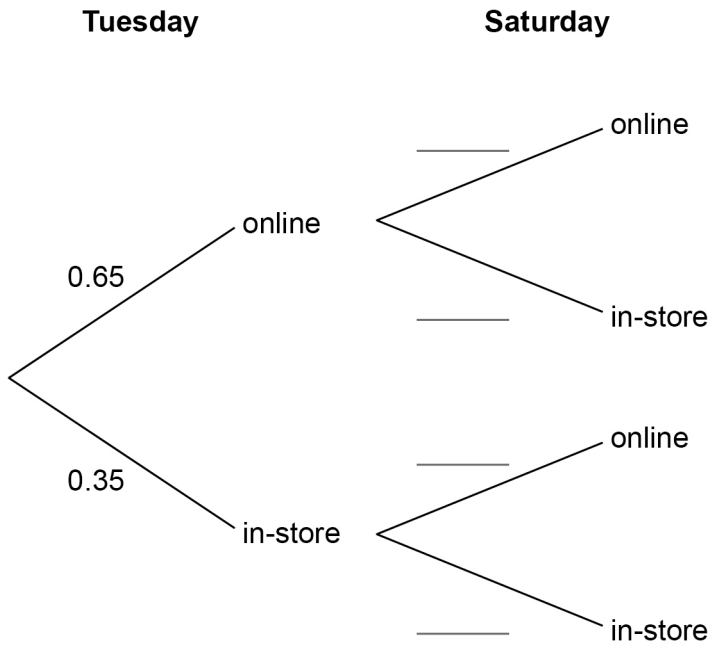
11 Ryan shops for groceries every Tuesday and Saturday.

He only shops either online or in-store.

The tree diagram shows some of the probabilities.



If Ryan shops online on Tuesday, the probability he shops **online** on Saturday is 0.2

If Ryan shops in-store on Tuesday, the probability he shops **online** on Saturday is 0.4

11 (a) Complete the tree diagram to show the probabilities for Saturday.

[2 marks]

11 (b) Work out the probability that Ryan will shop for groceries online **at least once** next week.

[3 marks]

Answer _____

5

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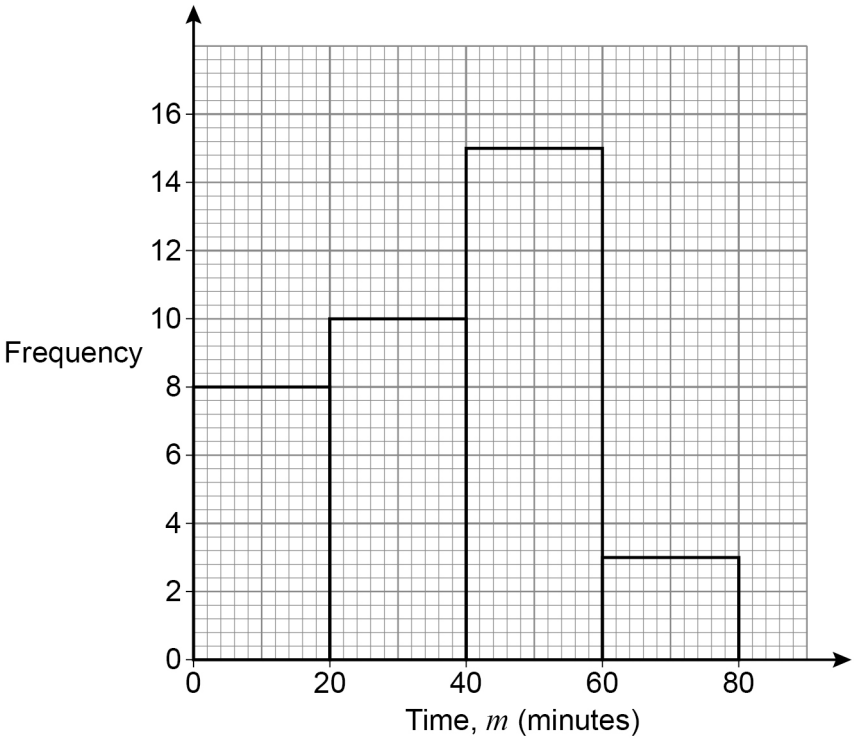
12 Erika records the time, m, in minutes, that it takes her to complete each piece of homework set during a term.

Her results are represented in the diagram.



By calculating an estimate of the mean, work out whether Erika takes, on average, between 30 and 40 minutes to complete each piece of homework.

You may use the table below to help you.

[5 marks]

5

Turn over ►

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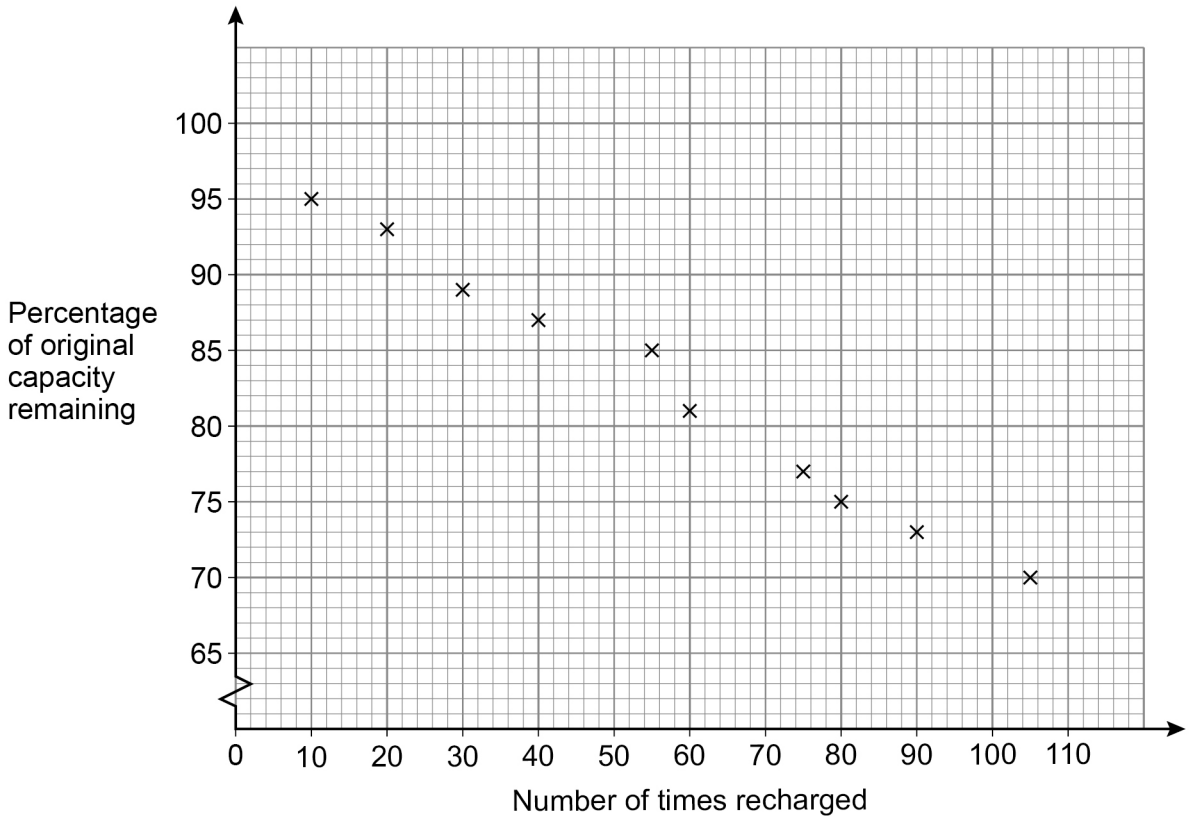
13 Raj is investigating rechargeable batteries.

Battery capacity is a measure of how much power can be stored in a battery.

Rechargeable batteries lose some of their capacity each time they are recharged.

The scatter graph shows information for 10 different rechargeable batteries.



13 (a) The coordinates for the double mean point for these data are (a, 82.5)

Work out the value of a.

[2 marks]

Answer _____

13 (b) Using your answer to **part (a)** draw a line of best fit on the scatter graph.

[2 marks]

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13 (c) Raj uses the scatter graph to predict the percentage of original capacity remaining in a battery after it has been recharged 70 times.

Will his prediction be accurate?

Tick (✓) a box.

Yes ☐ No ☐ Cannot tell ☐

Give a reason for your answer.

[2 marks]

_____

_____

_____

6

Turn over for the next question

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14 Chris thinks that weeds are spreading on a football field.

He samples the number of weeds per square metre in different places on the field.

He chooses 5 places along one side of the field.

14 (a) Write down **two** ways in which Chris could make his sample more representative.

[2 marks]

1 _____

_____

2 _____

_____

14 (b) After collecting his first sample Chris treats the field to remove the weeds.

The next day, he collects a second sample to see if the treatment has had an effect.

Chris counts the weeds in several places, chosen at random.

Write down **one** way in which Chris can improve how he collects his second sample.

[1 mark]

_____

_____

3

END OF QUESTIONS

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