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**

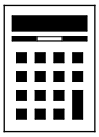
## Foundation tier Paper 1

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** | |

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

*Do not write outside the box*

**1** An event is more likely to happen than not.

Circle a possible probability of the event happening.

**[1 mark]**

0 $\frac{2}{7}$ 60% 1.4

1

**2** Which of these is qualitative data about a horse?

Circle your answer.

**[1 mark]**

The length of the horse's face | The age of the horse

The mass of the horse | The colour of the horse

1

**3** Circle the value that indicates a strong correlation.

**[1 mark]**

1.2 – 0.86 0.51 0

1

**4** A bank asks a representative sample of 50 customers about internet banking.

40 of these customers feel internet banking is secure.

Based on this sample, estimate the proportion of the **population** who feel that internet banking is secure.

Circle your answer.

**[1 mark]**

0.8 0.2 0.6 0.4

1

*Do not write outside the box*

**5** Jack is wondering whether he gets value for money from his subscription to a sports channel.

He records the number of live football matches he watches for each of the **40** weeks in the season.

Some of his results are shown in the table.

| Number of matches watched in a week | | Frequency |
|---|---|---|
| 0 | \|\|\| | 3 |
| 1 | 𝍸 \|\|\| | |
| 2 | 𝍸 𝍸 𝍸 \|\|\| | 18 |
| 3 | | 7 |
| 4 | \|\|\|\| | 4 |

**5 (a)** Complete the table by filling in the **three** empty cells correctly.

**[3 marks]**

**5 (b)** Jack chooses one of the 40 weeks at random.

**5 (b) (i)** What is the probability he chooses a week in which he watched **five** matches?

**[1 mark]**

Answer _____

**5 (b) (ii)** What is the probability he chooses a week in which he watched exactly **two** matches?

**[2 marks]**

_____

_____

Answer _____

**5 (b) (iii)** What is the probability he chooses a week in which he watched at least **three** matches?

**[1 mark]**

_____

_____

Answer _____

**7**

**Turn over ►**

*Do not write outside the box*

**6** Ronnie and Lewis are looking for new cushions for their living room.

They record the colour of each cushion they like.

The pictogram shows some of this information.

| | |
|---|---|
| **Red** | ○ |
| **Brown** | ○ ○ ○ |
| **White** | ○ ○ ○ ○ ◔ |
| **Multi-coloured** | |

**Key:** ○ represents 4 cushions

**6 (a)** How many **more** brown cushions than red cushions do they like?

**[2 marks]**

Answer _____

**6 (b)** They liked 10 different **multi-coloured** cushions.

Complete the pictogram to show this information.

**[2 marks]**

**6 (c)** Assume that they decide to buy one of the cushions represented in the pictogram.

**6 (c) (i)** What is the probability that they buy a **white** cushion?

**[3 marks]**

Answer _____

*Do not write outside the box*

**6 (c) (ii)** What **other** assumption did you have to make to answer **part (c)(i)**?

**[1 mark]**

8

**Turn over for the next question**

*Do not write outside the box*

**7 (a)** As part of a school project Hakeeb asks 10 of his friends to write down how many **hours** they slept last Sunday night.

These are the 10 values given by his friends.

6 8 6 480 7 9 7 8.5 8 6

**7 (a) (i)** Identify the value which appears to be incorrect.

**[1 mark]**

Answer _____

**7 (a) (ii)** Suggest, in context, what might have happened and write down the correct value.

**[2 marks]**

**What might have happened** _____

_____

_____

**Correct value** _____

**7 (b)** Here is part of a statement seen in a text book.

'Raw data sometimes need to be 'cleaned' so that...'

**7 (b) (i)** What are raw data?

**[1 mark]**

_____

_____

_____

*Do not write outside the box*

**7 (b) (ii)** What does 'cleaned' mean in this statement?

**[1 mark]**

**7 (b) (iii)** Complete the sentence from the book to give a reason **why** cleaning may take place.

**[1 mark]**

'Raw data sometimes need to be 'cleaned' so that…' _____

_____

_____

**6**

**Turn over for the next question**

*Do not write outside the box*

**8** Rachel has a social media account and tracks the number of new followers she gets each day.

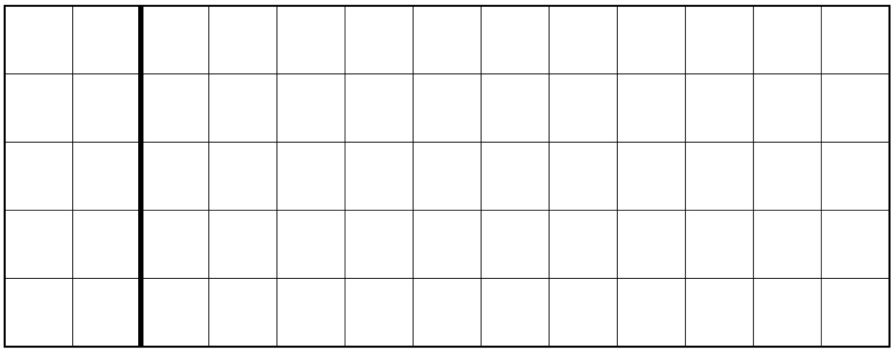
The table shows the data for the last three weeks.

| Week 1 | New followers | Week 2 | New followers | Week 3 | New followers |
|---|---|---|---|---|---|
| Monday | 14 | Monday | 13 | Monday | 16 |
| Tuesday | 16 | Tuesday | 20 | Tuesday | 21 |
| Wednesday | 12 | Wednesday | 16 | Wednesday | 17 |
| Thursday | 11 | Thursday | 13 | Thursday | 15 |
| Friday | 21 | Friday | 24 | Friday | 56 |
| Saturday | 34 | Saturday | 38 | Saturday | 55 |
| Sunday | 40 | Sunday | 42 | Sunday | 40 |

**8 (a)** Show the data in an ordered stem-and-leaf diagram.

**[4 marks]**

**Key:** _____|_____ represents _____ new followers



You may use the blank space below to sort the data.

*Do not write outside the box*

**8 (b)** Using the stem-and-leaf diagram, show that the median number of new followers she received during this three-week period is 20.

**[1 mark]**

**8 (c)** Rachel makes this statement about **weekends**.

'The mean number of new followers at weekends is more than 20.'

Explain, **without calculation**, why Rachel is correct.

**[1 mark]**

**8 (d)** Rachel makes this statement about **weekdays**.

'The mean number of new followers on weekdays is less than 20.'

Decide whether Rachel's second statement is true.

Tick (✓) a box about the statement.

True ☐ False ☐ Cannot tell ☐

You **must** show your calculations.

**[3 marks]**

9

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**9** Dr Cho runs a clinic where each appointment is meant to be 5 minutes.

She thinks that some doctors at the clinic are spending much longer than 5 minutes with a patient.

**9 (a)** The table shows information about actual lengths, in minutes, of appointments for one day.

| **Length, $t$ (mins)** | **Frequency** | | |
|---|---|---|---|
| $0 < t \leqslant 2$ | 8 | | |
| $2 < t \leqslant 4$ | 44 | | |
| $4 < t \leqslant 6$ | 43 | | |
| $6 < t \leqslant 8$ | 11 | | |
| $8 < t \leqslant 10$ | 10 | | |

Dr Cho says,

"The data show that the mean length of an appointment is longer than 5 minutes."

Calculate an estimate of the mean length of appointment to decide if she is correct.

**[5 marks]**

*Do not write outside the box*

**9 (b)** Dr Cho wants to investigate any relationship that might exist between the length of an appointment and the age of the patient.

She collects data from a random sample of 20 patients.

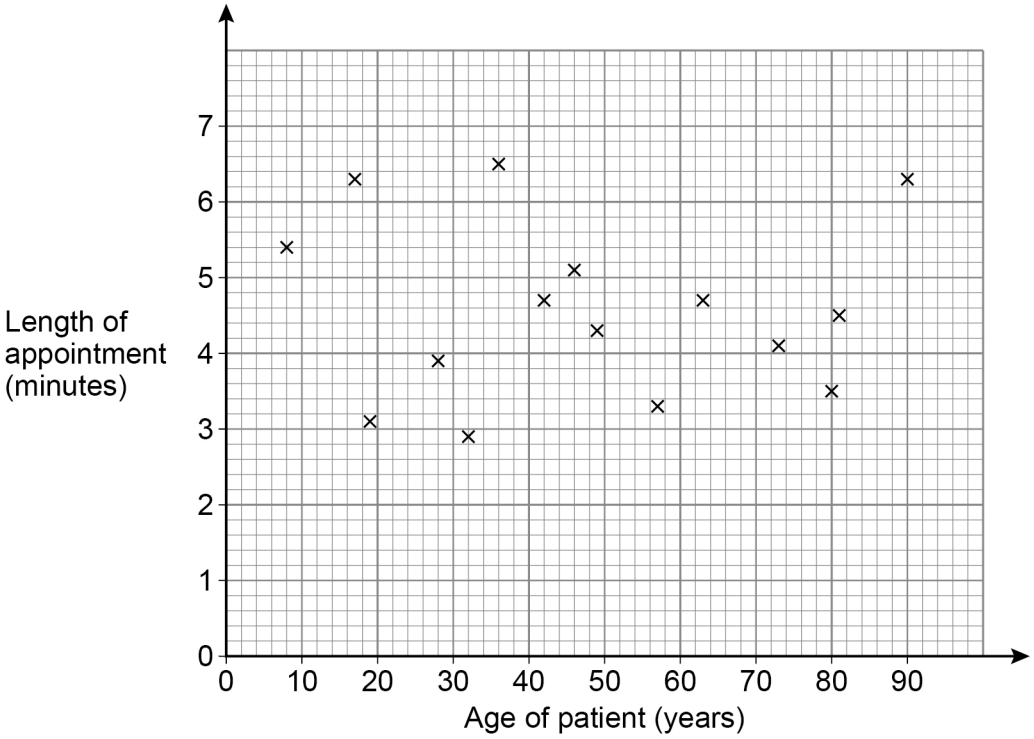
The scatter diagram shows 15 of the results.

The table shows the remaining 5 results.

| **Age of patient (years)** | 12 | 26 | 40 | 55 | 76 |
|---|---|---|---|---|---|
| **Length of appointment (minutes)** | 3.1 | 2.4 | 4.5 | 2.5 | 5.8 |

**9 (b) (i)** Use the data in the table to complete the scatter diagram.

**[2 marks]**




**9 (b) (ii)** Dr Cho says she can predict the length of an appointment if she knows the age of a patient.

Comment on her statement.

**[1 mark]**

**8**

**Turn over ►**

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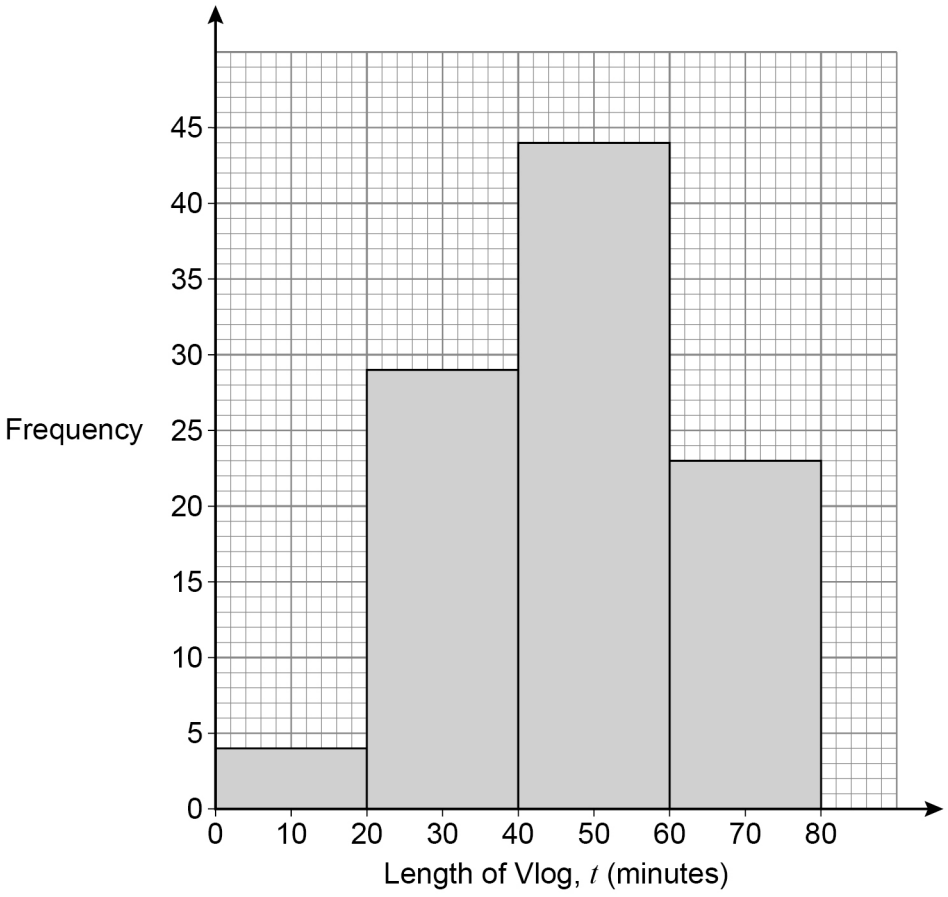
**10** The equal-width histogram shows information about the length of 100 Vlogs (video blogs) about **gaming**.




**10 (a)** What is the length of the longest of these 100 Vlogs?

Circle your answer.

**[1 mark]**

44 minutes  79 minutes  80 minutes  Cannot tell

**10 (b)** Complete the grouped frequency table for these 100 gaming Vlogs.

**[2 marks]**

| **Length of Vlog, *t* (minutes)** | **Frequency** |
|---|---|
| $0 < t \leqslant 20$ | 4 |
| $20 < t \leqslant 40$ | |
| | 44 |
| | |

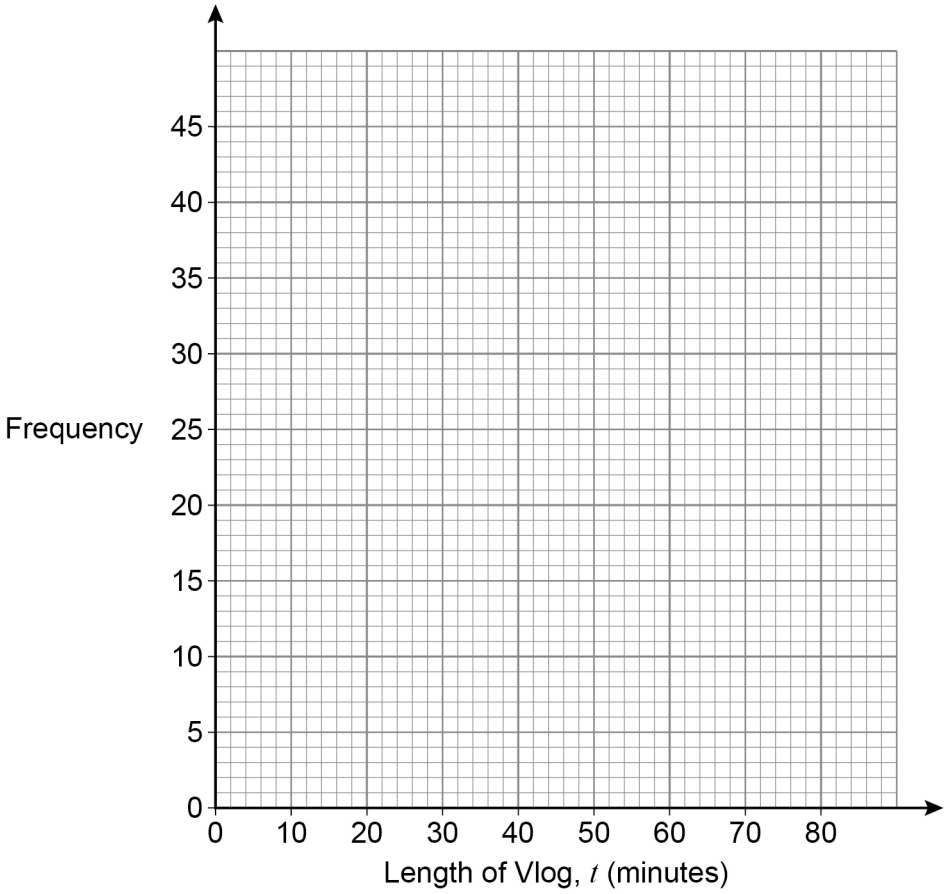
*Do not write outside the box*

**10 (c)** This table shows information about the length of 100 Vlogs about **fashion**.

| Length of Vlog, $t$ (minutes) | Frequency |
|---|---|
| $0 < t \leqslant 20$ | 38 |
| $20 < t \leqslant 40$ | 45 |
| $40 < t \leqslant 60$ | 17 |
| $60 < t \leqslant 80$ | 0 |

On the graph paper below, draw an equal-width histogram for the fashion Vlogs.

**[2 marks]**




**10 (d)** Make **two** comparisons of the length of gaming Vlogs with the length of fashion Vlogs.

**[2 marks]**

Comparison 1 _____

_____

_____

Comparison 2 _____

_____

_____

7

**Turn over ►**

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**11** Lauren plays online games with 6 friends.

She likes to pick at random which friend she invites to join the game first.

Explain how Lauren could use a single dice to pick one of these friends at random.

**[3 marks]**

3

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**12** Here is a table showing the cumulative frequencies for the length of 140 sales calls (in minutes) made by Kelly last week.

| Length of call $t$ (in minutes) | Cumulative frequency |
|---|---|
| $t \leqslant 2$ | 30 |
| $t \leqslant 4$ | 80 |
| $t \leqslant 6$ | 92 |
| $t \leqslant 8$ | 116 |
| $t \leqslant 10$ | 124 |
| $t \leqslant 12$ | 136 |
| $t \leqslant 14$ | 140 |

| Length of call $t$ (in minutes) | Frequency |
|---|---|
| $0 < t \leqslant 2$ | |
| $2 < t \leqslant 4$ | |
| $4 < t \leqslant 6$ | |
| $6 < t \leqslant 8$ | |
| $8 < t \leqslant 10$ | |
| $10 < t \leqslant 12$ | |
| $12 < t \leqslant 14$ | |

**12 (a)** How many calls were 10 minutes or shorter?

**[1 mark]**

Answer _____

**12 (b)** How many calls were **more** than 12 minutes?

**[2 marks]**

_____

_____

Answer _____

**12 (c)** Which two-minute interval is the modal class?

Justify your answer with calculations.

It may help to complete the extra column in the table at the top of this page.

**[3 marks]**

**Modal class** _____ minutes

_____

_____

_____

**Question 12 continues on the next page**

**Turn over ►**

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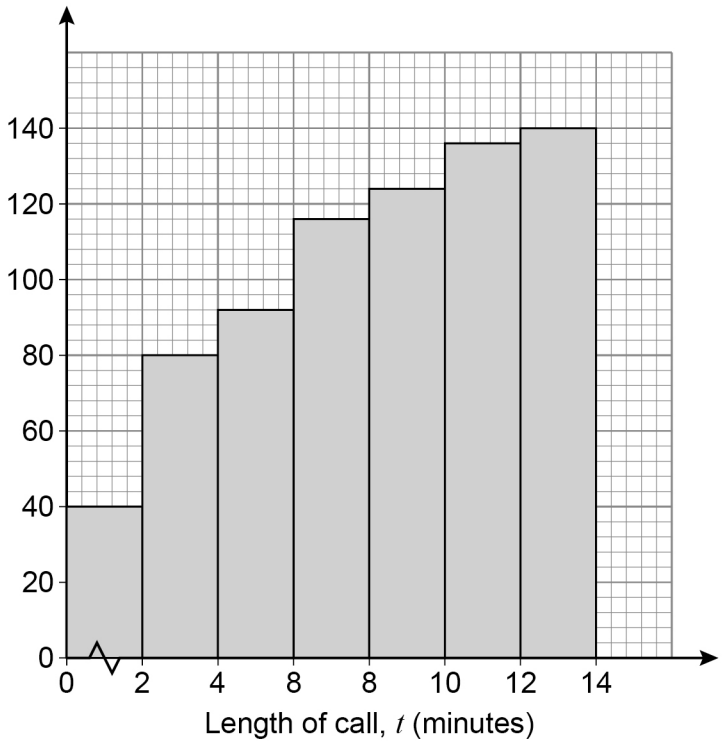
**12 (d)** Kelly tries to draw a cumulative frequency graph for her call data.

This graph has several errors.




Identify **three** of the errors in the graph.

**[3 marks]**

**Error 1** _____

_____

_____

**Error 2** _____

_____

_____

**Error 3** _____

_____

_____

9

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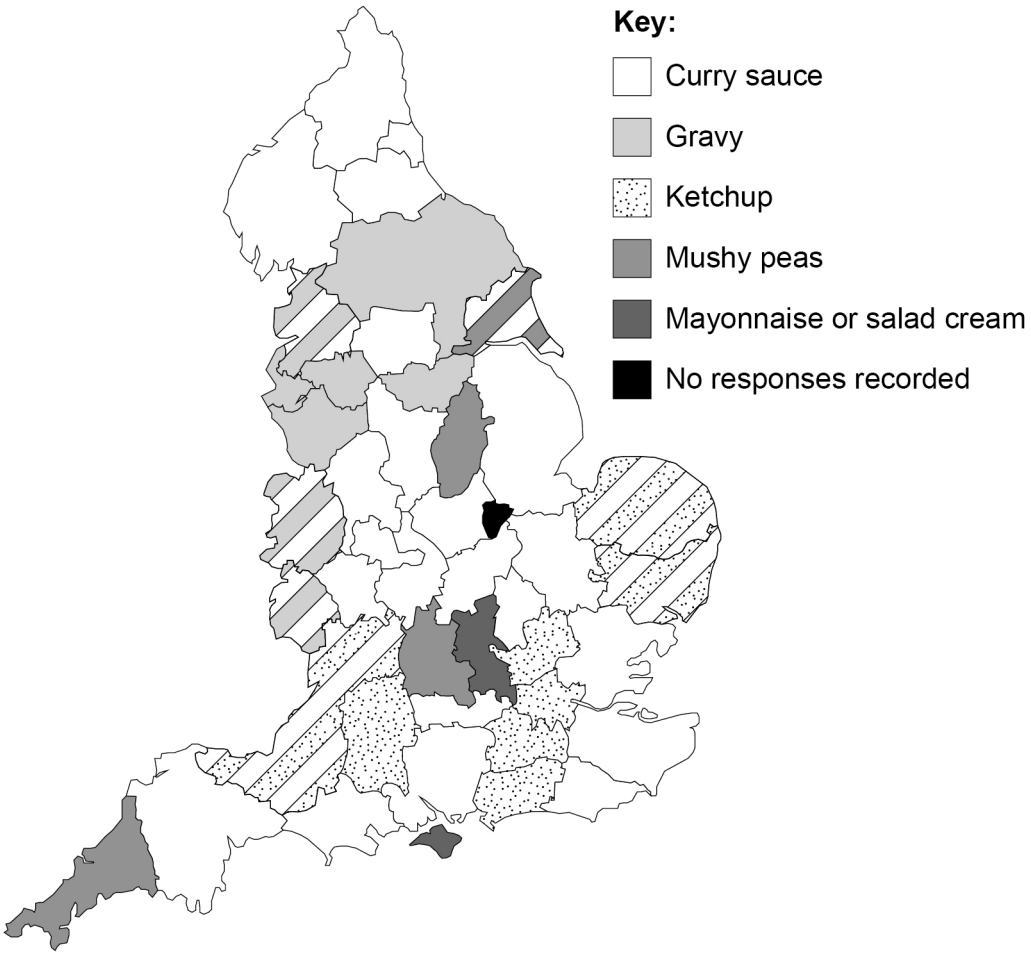
**13** A sample of 670 adults in England were asked what side order they preferred at fish and chip shops.

A striped area indicates two equally popular side orders.




**13 (a)** Based on area of land, which is the most popular side order?

**[1 mark]**

Answer _____

**13 (b)** Give **two** reasons why your answer to **part (a)** might not be the side order that **most** people eating fish and chips in England prefer.

**[2 marks]**

1 _____

_____

2 _____

_____

**3**

**Turn over ►**

*Do not write outside the box*

**14** Tom is doing a statistical study into the amount of homework received by Year 7 and Year 11 students in his school.

**14 (a)** Write down a hypothesis Tom could use.

**[1 mark]**

**14 (b)** State the population of his study.

**[1 mark]**

**14 (c)** Tom wants a sample of Year 7 students and a sample of Year 11 students to complete a questionnaire for him.

He considers these three sampling methods for Year 7 students.

**Method A**

Number all the students in Year 7.
Obtain 30 random numbers.
Ask the students whose random numbers come up to complete the questionnaire.

**Method B**

Wait outside the dinner hall.
Ask the first 30 Year 7 students he sees to complete the questionnaire.

**Method C**

Choose three Year 7 students from each of the 10 maths sets.
Ask these students to complete his questionnaire.

Name and compare the merits of each sampling method.
Make a reasoned choice of which method Tom should use.

**[7 marks]**

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**Question 14 continues on the next page**

*Do not write outside the box*

**14 (d)** One of Tom's questions is,

'How much homework do you receive?'

Write down **two** problems with this question.

**[2 marks]**

Problem 1 _____

_____

Problem 2 _____

_____

**14 (e)** Tom improves his questionnaire and collects his data.

He finds that:

- on average Year 7 have five hours of homework per week
- on average Year 11 have eight hours of homework per week.

Write a possible conclusion for Tom.

**[1 mark]**

_____

_____

**Question 14 continues on pages 22 and 23**

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**Question 14 continues on the next page**

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**ANSWER IN THE SPACES PROVIDED**

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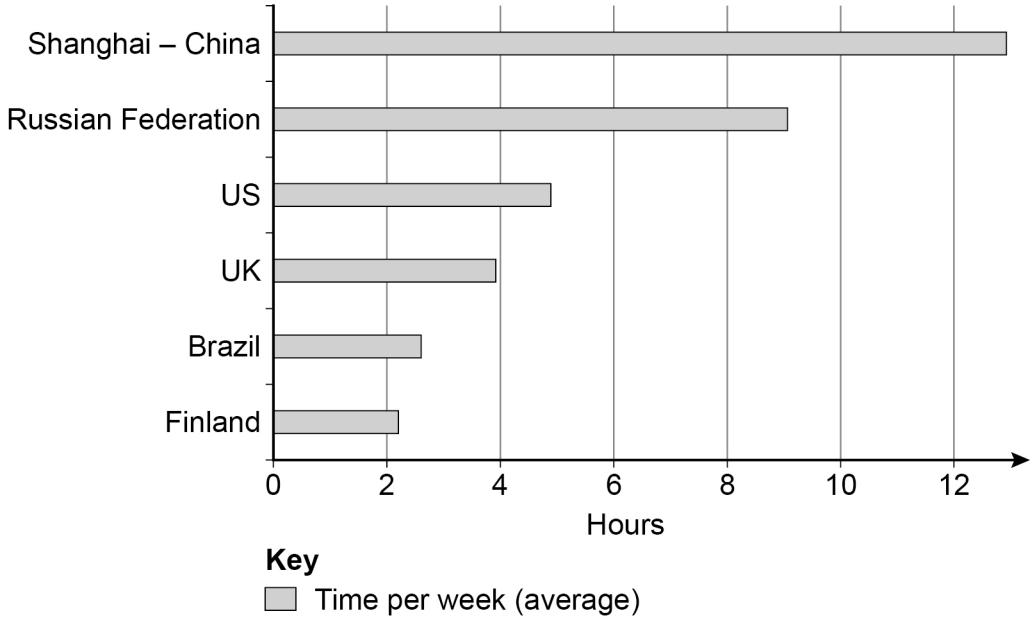
**14 (f)** Tom wonders how this compares with other schools in the UK and schools in other countries.

He finds this chart on the internet but it has no source.

**How much time do 15-year-olds spend on homework?**




Use the chart to compare Tom's Year 11 results of an average of 8 hours homework per week with those for other schools in the UK and with other countries.

**[2 marks]**

Tom's school and other UK schools _____

_____

_____

Tom's school and schools in other countries _____

_____

_____

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**14 (g)** Why are Tom's data and the internet data not completely comparable?

**[1 mark]**

**14 (h)** Is Tom's data or the internet data more reliable?

Give a reason for your answer.

**[1 mark]**

**16**

**END OF QUESTIONS**

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| Question number | **Additional page, if required.**<br>**Write the question numbers in the left-hand margin.** |
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