AQA

Please write clearly in block capitals.

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

Surname _____

Forename(s) _____

Candidate signature _____

GCSE
STATISTICS

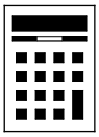
F

Foundation tier Paper 1

Thursday 13 June 2019 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 the 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.
- Do all rough work in this book. Cross out any work you do not want to be marked.

Information
- The marks for the 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	
15	
TOTAL	

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

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1 What is the name for data that has been collected but not sorted in any way?

Circle your answer.

[1 mark]

raw ordinal discrete grouped

1

2 Which of these is **least likely** to be a constraint that may be faced when designing an investigation?

Circle your answer.

[1 mark]

time cost privacy temperature

1

3 For the numbers

3 3 6

circle the measure that has a **different value** to the others.

[1 mark]

range mode median mean

1

Do not write outside the box

4 A **biased** dice is rolled 100 times.

The number 4 appears 50 times.

Estimate the probability that a 4 will appear on the next roll.

Circle your answer.

[1 mark]

$\frac{4}{6}$ $\frac{1}{6}$ $\frac{4}{50}$ $\frac{1}{2}$

1

Turn over for the next question

Do not write outside the box

5 (a) Grace buys lunch at her favourite sandwich shop each day.

She records the time (in minutes) she has to queue for each of 20 visits.

3 2 4 2 1 0 2 3 1 1

2 0 0 1 1 0 3 1 2 1

Complete the frequency table, including the remaining headings.

[4 marks]

	Tally	
0		
1		
2		
3		
4		

5 (b) Archie collects similar data for the same sandwich shop for 10 visits.

He recorded these times (in minutes).

3 2 3 0 1 44 2 4 3 0

Identify a problem with the data.

Suggest how to deal with the problem.

[2 marks]

Problem _____

_____

_____

Suggestion _____

_____

_____

Do not write outside the box

5 (c) Pavel collects data for the same shop.

He says,

"I've decided to group the data in groups of 5 minutes."

Comment on Pavel's decision.

[1 mark]

7

Turn over for the next question

Do not write outside the box

6 Quin is a window cleaner who works Monday to Friday each week.

Each day he has a list of **20** houses whose windows he plans to clean.

The table shows the risk, for different types of weather, that a house owner will **not** want their windows cleaning.

Weather	Risk
Sunny	0%
Light Rain	50%
Heavy Rain	90%

6 (a) On Monday there is **light rain**.

Work out the number of houses whose windows Quin should expect to clean.

[1 mark]

Answer _____

6 (b) On Tuesday there is **heavy rain**.

Show that he should expect to clean the windows of only **2** houses that day.

[1 mark]

Do not write outside the box

6 (c) By the end of Friday, Quin expected to clean the windows of 54 houses.

Complete the table to show **one** possibility for the remaining weather that week.

[2 marks]

Day	Monday	Tuesday	Wednesday	Thursday	Friday
Weather	Light rain	Heavy rain			

6 (d) That week, the mean number of houses whose windows Quin actually cleaned per day was 12

How does this compare with the expected number given in **part (c)**?

[2 marks]

6 (e) Give a possible reason for the difference between the theoretical and actual results.

[1 mark]

7

Turn over ►

Do not write outside the box

7 Fracking is a process used to extract oil or gas from the ground.

Some plans are made to use fracking near the town where Amelia lives.

Amelia is strongly opposed to it and decides to get opinions about it from residents in her town.

7 (a) Amelia decides to ask **everyone** in the town their opinion.

Circle the name for this data collection method.

[1 mark]

sample observation census experiment

7 (b) Why might it **not** be a good idea to try to ask everyone in the town?

[1 mark]

7 (c) Amelia writes a questionnaire to give to residents.

Write a **closed** question, with a response section, that Amelia could use to find out the distance a resident lives from the fracking site.

[3 marks]

Response section

Do not write outside the box

7 (d) (i) Write an **open** question that Amelia could use to find out the age of a resident.

[1 mark]

7 (d) (ii) Was it a good idea to use an open question about age?

Tick (✓) one box.

Yes ☐ No ☐

Give a reason for your answer.

[1 mark]

7 (e) Another question Amelia writes is,

'Do you agree that fracking is dangerous and damages the countryside?'

Give **two** criticisms of this question.

[2 marks]

Criticism 1

Criticism 2

9

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8 Two ordinary fair dice are rolled and their scores are added to make a total.

8 (a) Complete the sample space diagram below to show all the possible totals.

[2 marks]

Score on first dice

Score on second dice	**+**	**1**	**2**	**3**	**4**	**5**	**6**
	1	2					
	2		4				8
	3						
	4						
	5			8			
	6						

8 (b) Using your diagram, or otherwise, work out

8 (b) (i) the probability of scoring a total of 4

[2 marks]

Answer _____

8 (b) (ii) the probability of scoring **more** on the first dice than on the second dice.

[2 marks]

Answer _____

6

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9 A hotel chain has 800 hotels.

Of these hotels 200 have a car park.

Rogan wants to choose a sample of the hotel managers, stratified by whether they run a hotel with a car park or not.

Rogan wants a total sample size of 60

9 (a) How many managers who run a hotel with a car park should be in the sample?

[2 marks]

Answer _____

9 (b) Rogan will email a questionnaire to the managers.

Why will Rogan probably have to send out more than 60 emails **in total**?

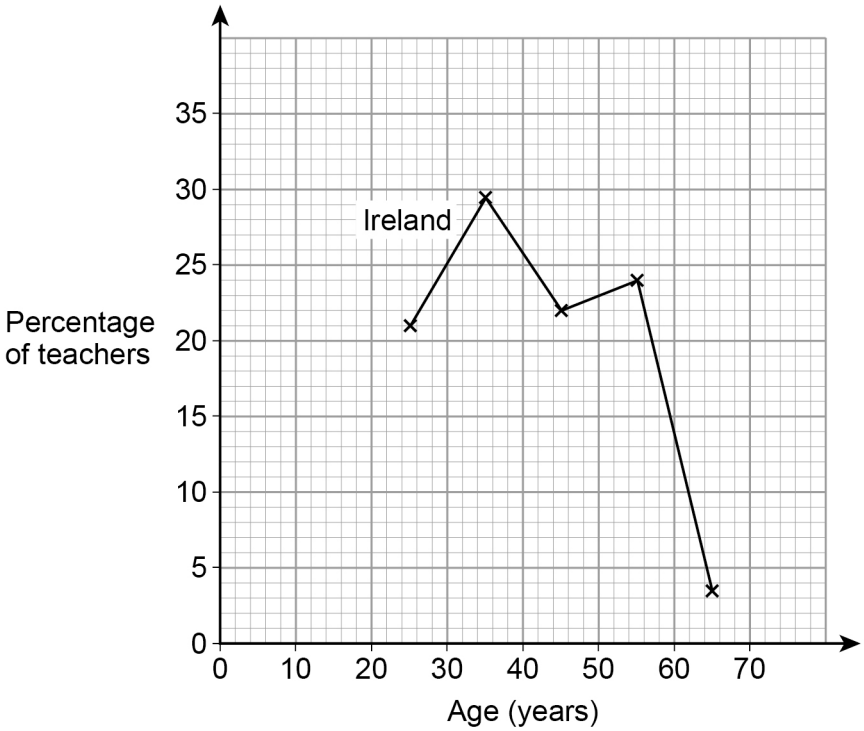
[1 mark]

3

Turn over for the next question

Do not write outside the box

10 The grid shows a frequency polygon of the percentage of teachers by age in **Ireland**.



10 (a) Circle the modal age group for teachers in Ireland.

[1 mark]

20 – 29 30 – 39 40 – 49 50 – 59 60 – 69

Do not write outside the box

10 (b) Explain why the point for the first group, 20 – 29, is plotted at 25

[1 mark]

10 (c) The table shows the percentage of teachers by age in **Norway**.

Age (years)	Percentage of teachers
20 – 29	9.2
30 – 39	31.1
40 – 49	19.8
50 – 59	27.9
60 – 69	12.0

Draw a frequency polygon for the Norway data on the same grid on page 12.

[2 marks]

10 (d) Compare the modal age group for teachers in the two countries.

[1 mark]

Question 10 continues on the next page

Do not write outside the box

10 (e) When comparing the **range** of ages for the two countries which of these is true?

Tick (✓) one box.

[2 marks]

The range is larger in Ireland. ☐

The range is larger in Norway. ☐

It is not possible to tell which range is larger. ☐

The ranges are the same. ☐

Give a reason for your answer.

10 (f) Make **one** further comparison between the data for Ireland and Norway.

[1 mark]

8

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11 This diagram was produced after the Winter Olympics of 2018.

Source: BBC

11 (a) Make **three** criticisms of the diagram.

[3 marks]

Criticism 1 _____

_____

Criticism 2 _____

_____

Criticism 3

_____

11 (b) Name a different diagram which would show the data in a more appropriate way.

[1 mark]

Answer _____

4

Do not write outside the box

12 The table, from the Office of National Statistics, shows conception (becoming pregnant) rates for women of all ages and for women under 16 from 2000 to 2016.

Year of conception	All ages		Under 16	
	Number of conceptions	Conception rate per 1000 women in age-group	Number of conceptions	Conception rate per 1000 women in age-group
2016	862 785	77.3	2821	3.1
2015	876 934	78.3	3466	3.8
2014	871 038	77.8	4160	4.4
2013	872 849	77.8	4648	4.9
2012	884 748	78.5	5432	5.6
2011	909 109	80.4	5991	6.1
2010	909 245	80.5	6674	6.8
2009	896 466	79.3	7158	7.2
2008	888 607	78.6	7586	7.6
2007	895 867	79.4	8200	8.1
2006	869 961	77.5	7826	7.7
2005	841 831	75.5	7930	7.8
2004	826 809	74.9	7615	7.5
2003	806 810	73.5	8024	8.0
2002	787 012	72.1	7875	7.9
2001	763 668	70.3	7903	8.0
2000	766 955	70.9	8116	8.3

Source: Office of National Statistics

Do not write outside the box

12 (a) In which of these years were there the most conceptions for **Under 16s**?

Circle your answer.

[1 mark]

2000 2003 2007 2010

12 (b) Describe **two** features or patterns in the data for **all ages** from 2000 to 2016.

[2 marks]

1 _____

_____

2 _____

_____

12 (c) Bruno thinks the conception rate calculations for Under 16s are wrong.

He says,

> "In 2015 there were 3466 conceptions and the conception rate was 3.8 per thousand.
>
> In 2008, the conception rate was double at 7.6 per thousand but the number of conceptions was 7586
>
> This must be wrong as 7586 is much more than double 3466"

Give **two** reasons why the conception rate calculations are very unlikely to be wrong.

[2 marks]

Reason 1 _____

_____

_____

Reason 2 _____

_____

_____

5

Do not write outside the box

13 The table shows the price of a first class stamp for selected years.

Throughout this question use 1980 as the base year.

Year	Price
1980	12p
1992	
2008	36p
2018	62p

13 (a) The index number of the price of a first class stamp in 1992 is 200

Circle the cost of a first class stamp in 1992.

[1 mark]

14p 18p 24p 36p

13 (b) Calculate the index number for **2018**.

Give your answer to the nearest whole number.

[2 marks]

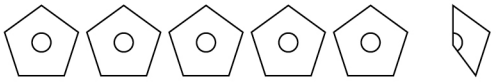
Answer _____

3

Do not write outside the box

14 A bird charity places nest boxes in three woodlands, Staple Woods, East Valley Woods and Stourness Woods.

The pictogram shows the number of nest boxes it places in each woodland.

Staple Woods	
East Valley Woods	
Stourness Woods	

Key:  represents _____ nest boxes

14 (a) The charity places 24 more nest boxes in East Valley Woods than it places in Stourness Woods.

Show that  represents 15 nest boxes.

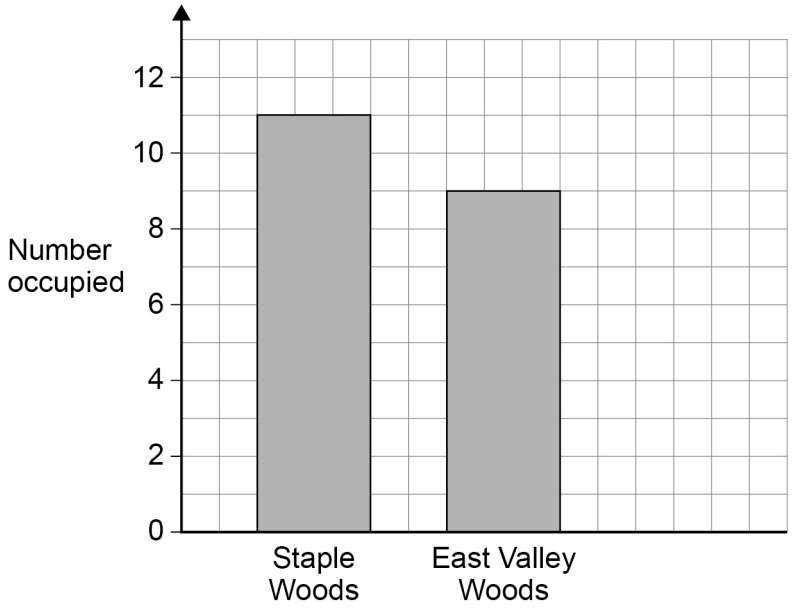
[2 marks]

Question 14 continues on the next page

Do not write outside the box

At the end of the year, the charity checks the nest boxes to see if they have been occupied by birds.

The bar chart shows the number of occupied nest boxes in two of the woodlands.



14 (b) Mandy claims that a greater proportion of the nest boxes in Staple Woods were occupied than the boxes in East Valley Woods.

Is she correct?

Tick (✓) one box.

Yes ☐ No ☐

You **must** show your working.

[3 marks]

Do not write outside the box

14 (c) The charity finds that exactly 10% of all the nest boxes have been occupied.

Complete the bar chart on the page opposite to show the number of occupied nest boxes in Stourness Woods.

[3 marks]

8

Turn over for the next question

Do not write outside the box

15 Charlie wants to investigate how people do most of their travelling.

She begins by asking 30 of her friends how they travel to school.

15 (a) Write down a question that Charlie could ask.

[1 mark]

15 (b) The frequency table shows Charlie's results.

Method of Travel	Frequency
Car	3
Bus	6
Walk	18
Cycle	2
Train	1

Charlie says,

> "10% of these friends come to school by car, so 10% of all students come to school by car."

Comment on **both parts** of Charlie's statement.

[2 marks]

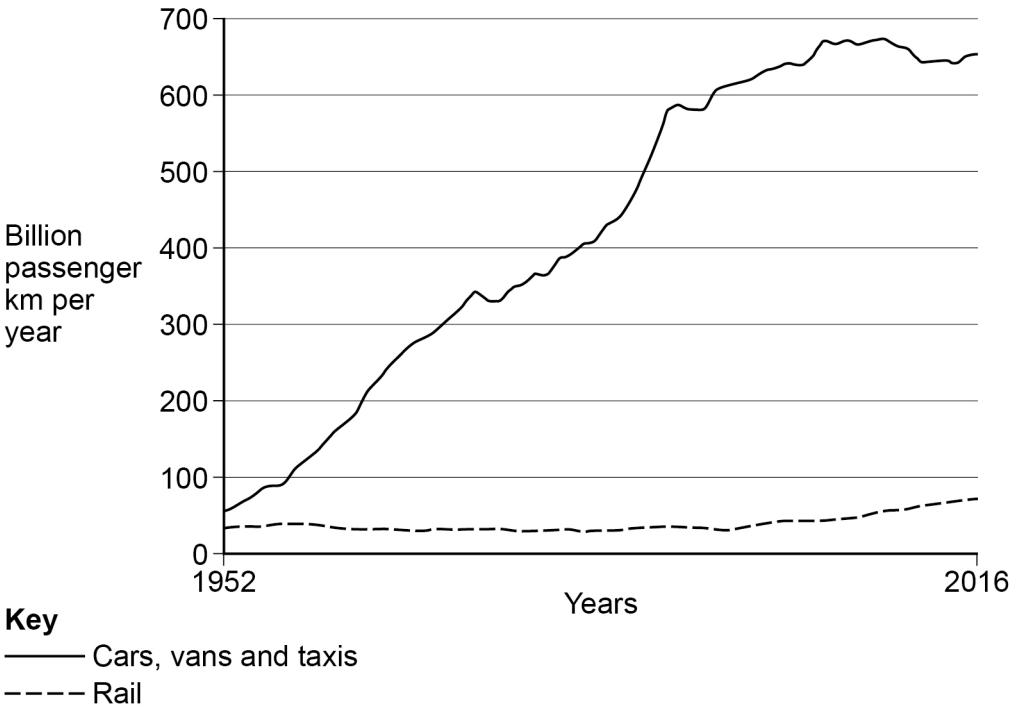
"10% of these friends come to school by car"

"10% of all students come to school by car"

Do not write outside the box

15 (c) Charlie hears on the news that more people than ever are using cars to travel and roads are getting busier.

She sees this graph on a news website.



Source: adapted from Department for Transport

Comment, with a reason, whether or not the graph confirms that,

15 (c) (i) more people are using their cars to travel.

[1 mark]

15 (c) (ii) roads are getting busier.

[1 mark]

Question 15 continues on the next page

Do not write outside the box

15 (d) Using the graph on page 23, make **two** statements about **rail** travel over the years.

[2 marks]

15 (e) Charlie decides to look into rail travel in more depth.

She asks 12 of her friends how many times they have been on a train in the last year.

The results, in ascending order, are

0 0 0 0 0 1 1 2 4 6 7 387

Charlie says,

"The average number of times my friends have been on a train in the last year is 34"

15 (e) (i) Which measure of average did Charlie work out?

Show working to support your answer.

[2 marks]

Answer _____

15 (e) (ii) Comment on the use of this measure of average in this context.

[1 mark]

Do not write outside the box

15 (e) (iii) Discuss the suitability of **two** other measures of average Charlie could use.

Suggest which would be the best measure of average to use.

[3 marks]

15 (f) Name **one** piece of primary data used in Charlie's investigation.

[1 mark]

15 (g) Name **one** piece of secondary data used in Charlie's investigation.

[1 mark]

15 (h) Give **one** way that Charlie could have improved the data collection at any point in her investigation.

[1 mark]

16

END OF QUESTIONS

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