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

Thursday 11 June 2020 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	
15	
TOTAL	

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

Do not write outside the box

1 What type of data is the number of adverts you see when watching a film?
Circle your answer.

[1 mark]

continuous grouped categorical discrete

1

2 Which of these values could **not** be a measure of correlation?
Circle your answer.

[1 mark]

−0.9 0 +0.5 +1.2

1

3 Which of these is a **small part** of the population, used to avoid having to ask everyone?
Circle your answer.

[1 mark]

census questionnaire sample representative

1

4 Here are the scores obtained when a biased spinner is spun 100 times.

Score	4	5	6	7	8	9	10	11
Frequency	17	3	0	2	16	24	18	20

Circle the best estimate of the probability of scoring 9

[1 mark]

$\frac{1}{24}$ 0.24 $\frac{9}{24}$ $\frac{1}{8}$

1

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5 Sam asks some friends how many internet-enabled devices are in their homes.

The results are

4 5 3 6 4 5 5 7 6 8 3 5

Three years earlier he had asked the same friends the same question.

The results were

Number of devices three years earlier	Frequency
1	1
2	4
3	6
4	0
5	1

By calculating a measure of average and a measure of spread, make **two** comparisons between the current data and the data for three years ago.

[5 marks]

Comparison 1 _____

_____

Comparison 2 _____

_____

5

Turn over ▶

Do not write outside the box

6 When some people eat a bacon sandwich, they have

- brown sauce on it
- red sauce on it
- no sauce on it.

Bob and Lisa decide to test the hypothesis

"The majority of people who have a bacon sandwich have red sauce on it."

6 (a) Bob's work canteen sells bacon sandwiches.

One morning, 300 people use the canteen for breakfast.

Bob decides to sample 30 of the 300 people to see which sauce, if any, they have on their bacon sandwich, if they buy one.

6 (a) (i) Describe how Bob could obtain a systematic sample of 30 people from the 300

[2 marks]

6 (a) (ii) Give **two** reasons why the sample Bob is obtaining is unlikely to be very useful in testing out the hypothesis.

[2 marks]

Reason 1 _____

Reason 2 _____

Do not write outside the box

6 (b) Lisa uses random sampling from those who eat bacon sandwiches at her local café to obtain the following data.

Type of sauce	Brown	Red	No sauce
Frequency	24	21	5

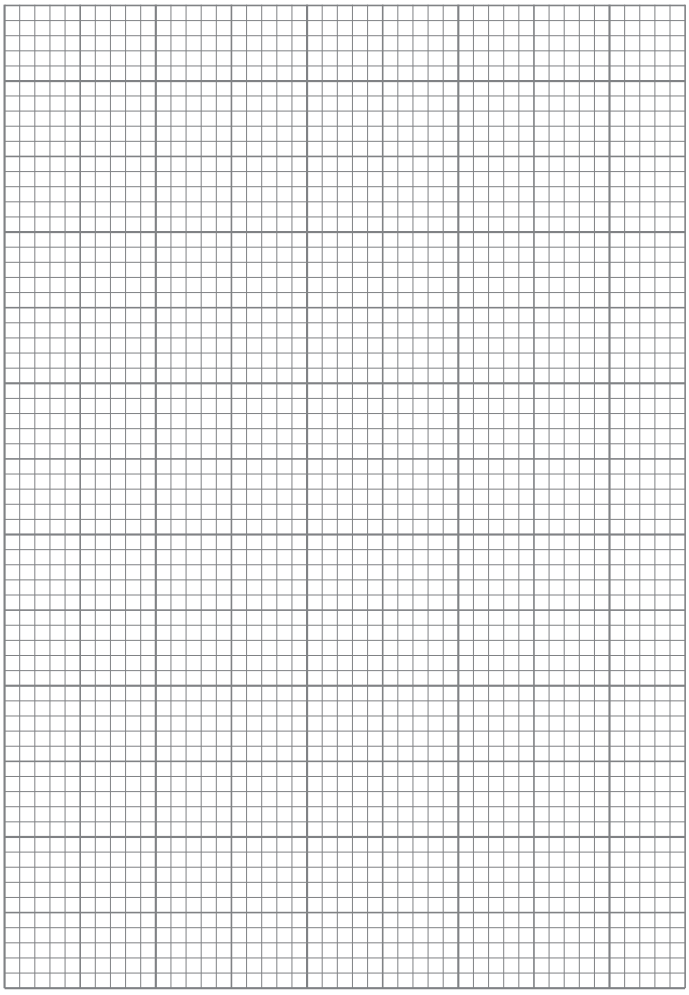
6 (b) (i) There is only one type of average available for the data.
Name the average and write down its answer.

[2 marks]

Name of average _____ **Answer** _____

6 (b) (ii) On the blank grid below, draw a suitable fully labelled graph for these data.

[4 marks]



6 (c) Using these data, write an appropriate conclusion for the hypothesis in **part (a)**.

[1 mark]

_____

_____

11

Turn over ▶

Do not write outside the box

7 The table shows the average cost of buying a house, a car and a basket of groceries for three different years in **Yorkshire**.

The average annual salary in Yorkshire for each year is also shown.

	Average costs for Yorkshire (£)			
Year	**House**	**Car**	**Groceries**	**Average annual salary (£)**
1966	3 609	960	1.02	829
1991	53 445	9 600	8.47	12 088
2016	144 361	21 164	13.60	27 456

Source adapted from www.hillarys.co.uk

7 (a) What was the average annual salary in 1991?

[1 mark]

Answer £ _____

7 (b) In 2016 groceries were just over 13 times more expensive than in 1966.

7 (b) (i) Show that in 2016 houses were, on average, 40 times more expensive than in 1966.

[1 mark]

_____

_____

7 (b) (ii) Compare how the cost of houses, cars and groceries in Yorkshire have gone up in comparison to each other between 1966 and 2016.

You **must** show your working.

[3 marks]

_____

_____

_____

_____

_____

_____

_____

Do not write outside the box

7 (c) Dilip sold a house in **London** for £10 000 in 1966.

He says,

"In 2016 this house would have been worth £400 000"

7 (c) (i) Show how Dilip worked out this value.

[1 mark]

7 (c) (ii) Give a reason why Dilip may be wrong.

[1 mark]

7 (d) Using 1966 as base, calculate the index number for the average cost of a car in 1991 in **Yorkshire**.

[2 marks]

Answer _____

9

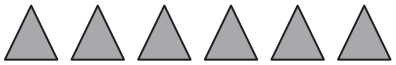
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8 The strength of volcanic eruptions is measured using the Volcanic Explosivity Index (VEI) using a scale of 0 – 8

From 1900 – 2019 there have been **79** eruptions of 4 or above on the VEI.

The pictogram represents some of this information.

1900 – 1919	
1920 – 1939	
1940 – 1959	
1960 – 1979	
1980 – 1999	
2000 – 2019	

Key:  represents _____ eruptions

Between 1920 and 1939, there were 12 eruptions of strength 4 or above.

Complete the pictogram, including the key.

[4 marks]

4

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9 Poppy wants to buy a season ticket at her local football club.

This will give her entry to **all** 20 home games over the season.

The table shows the cost of season tickets for the areas she is interested in.

Area	Cost if bought in July	Cost if bought in August
South Stand	£200	£220
West Stand	£175	£195
East Stand	£240	£250

9 (a) What is the cost of a West Stand season ticket bought on 15 August?

[1 mark]

Answer £ _____

9 (b) There is a 10% chance that Poppy will miss a home game.

9 (b) (i) How many of the 20 home games will Poppy expect to miss next season?

[2 marks]

_____

Answer _____

Question 9 continues on the next page

Do not write outside the box

9 (b) (ii) Poppy wants to sit in the **East Stand**.

The price of a ticket for Poppy for each home game would be £16

However, on 30 July she decides to buy a season ticket.

How much will she expect to save by buying the season ticket?

[3 marks]

Answer £ _____

9 (c) Poppy thinks the tickets at her club are more expensive than at other clubs in the same league.

She decides to investigate this.

Write down a possible hypothesis she could use.

[1 mark]

9 (d) Identify the population for her investigation.

[1 mark]

9 (e) Poppy decides to carry out a census.

What does that mean in this context?

[1 mark]

Do not write outside the box

9 (f) Here are some options for how Poppy might obtain appropriate data.

A – write a questionnaire and send it to all the other clubs
B – phone each of the other clubs and interview someone from the club
C – log on to the website of each club to try to find out the data
D – ask a season ticket holder from each club what they paid

9 (f) (i) Circle the letter of the best option for obtaining appropriate data.

[1 mark]

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

9 (f) (ii) For **two** of the options you did not choose, give a reason, different each time, why you did not choose that option.

[2 marks]

Option _____

Reason _____

_____

Option _____

Reason _____

_____

9 (f) (iii) For the option you **did** choose, state one issue that might arise during the process of collecting the data.

[1 mark]

_____

_____

9 (f) (iv) Describe one strategy to overcome the issue you said might arise in **part (iii)**.

[1 mark]

_____

_____

14

Turn over ▶

Do not write outside the box

10 Here are some variables.

Some are relevant to people and their main job and some are not.

A – How much you are paid in a year
B – Your favourite TV series
C – How many days of holiday you are allowed each year
D – How tall you are
E – Distance from your home to work
F – How much you like your work colleagues
G – How happy you are at work

Adam is investigating whether people who are paid more are happier at work.

10 (a) Write down a possible research question for Adam's investigation.

[1 mark]

_____

_____

10 (b) Write down the letter of the explanatory variable.

[1 mark]

Answer _____

10 (c) Write down the letter of the response variable.

[1 mark]

Answer _____

10 (d) Write down the letters of **two** possible extraneous variables.

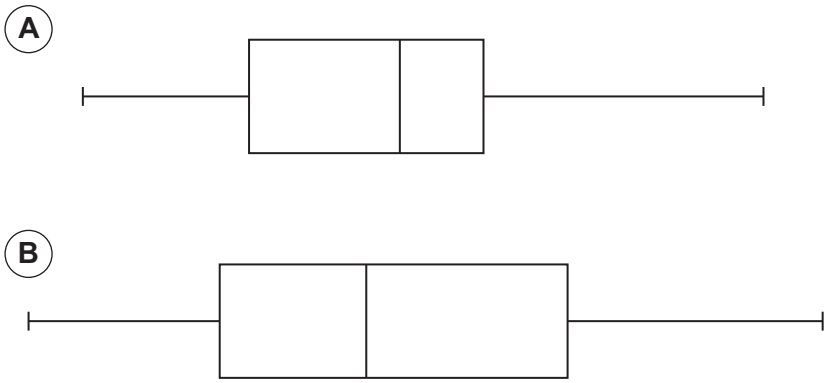
[2 marks]

Answer _____ and _____

5

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11 The diagram shows two box plots, **A** and **B**, which are plotted on the same scale.



11 (a) Circle whether each of these statements is true, false or you cannot tell.

[3 marks]

The minimum value of **A** is smaller than the minimum value of **B**.

True False Cannot tell

The median of **A** is smaller than the median of **B**.

True False Cannot tell

The interquartile range of **A** is smaller than the interquartile range of **B**.

True False Cannot tell

The mean of **A** is smaller than the mean of **B**.

True False Cannot tell

11 (b) A data value from box plot **A** is chosen at random.

Circle the probability that this value is between the minimum and maximum of the data represented by box plot **B**.

[1 mark]

0 $\frac{1}{2}$ 0.9 1

4

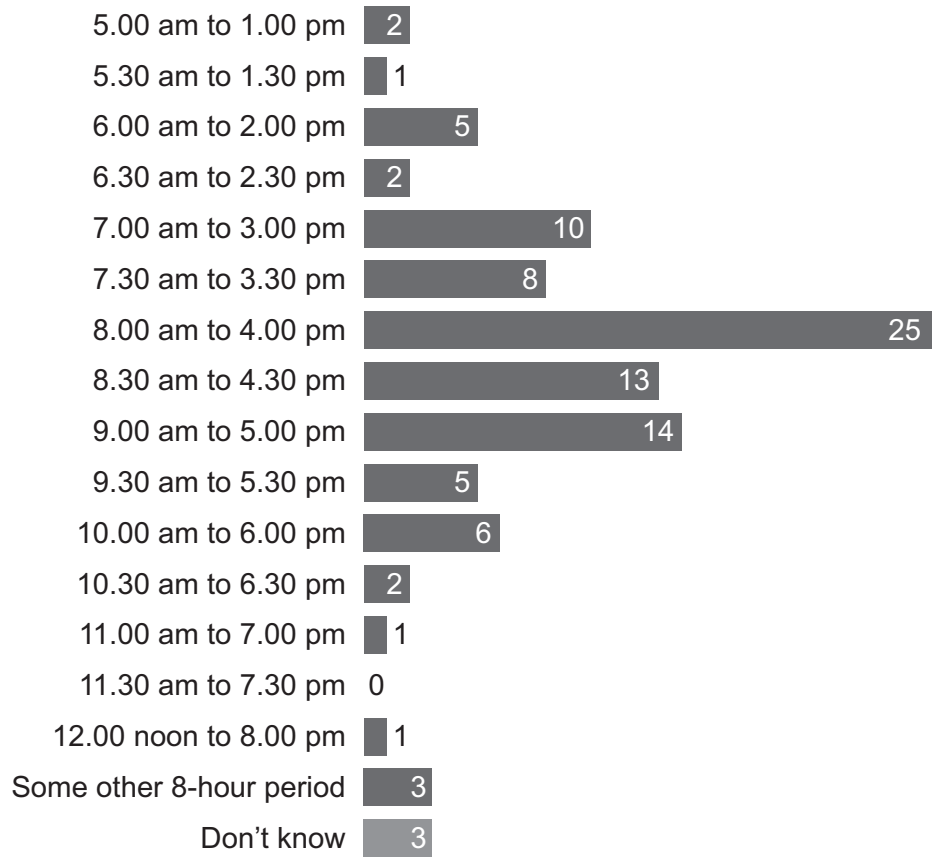
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12 A YouGov survey was carried out with nearly 2000 British working adults who have an 8-hour working day.

They were asked which period of 8 hours they would prefer to work.

YouGov produced this summary graph showing the **percentage** of each response, rounded to the nearest whole number.



Source: yougov.com

12 (a) Show that about two-thirds of adults questioned wanted to work **earlier** than the traditional 9 am to 5 pm working hours.

[2 marks]

Do not write outside the box

12 (b) Amber says,

"**None** of the adults questioned wanted to start work at 11.30 am."

Is Amber correct?

Tick (✓) a box.

Yes ☐ No ☐ Cannot tell ☐

Give a reason for your answer.

[1 mark]

12 (c) Give **one** reason why these results will **not** apply to all British working adults.

[1 mark]

4

Turn over for the next question

Do not write outside the box

13 200 students, 200 parents with young children and 200 retired people were asked what was the first thing they did on their mobile phones that day.

The results are shown in the table.

	Social media	**Gaming**	**News**	**Other**
Students	124	52	13	11
Parents	120	8	37	35
Retired	88	11	67	34

13 (a) One of the people is chosen at random.

13 (a) (i) Work out the probability that this person goes on social media first that day.

[2 marks]

Answer _____

13 (a) (ii) Work out the probability that this person does **not** go on gaming first that day.

[2 marks]

Answer _____

13 (b) One of the people who went on gaming first that day is chosen at random.

What is the probability that this person is retired?

[2 marks]

Answer _____

Do not write outside the box

13 (c) Work out the probability that **two** of the 200 retired people, chosen at random, both went on news first that day.

Give your answer to three decimal places.

[3 marks]

Answer _____

13 (d) Joe looks at the data in the table and makes the two statements below.

Is each statement correct?

Give a reason for each decision.

[2 marks]

Statement 1 Most of these 600 people went on social media first **that** day.

Tick (✓) a box.

Yes ☐ No ☐ Cannot tell ☐

Reason _____

Statement 2 Most of these 200 retired people go on social media first **every** day.

Tick (✓) a box.

Yes ☐ No ☐ Cannot tell ☐

Reason _____

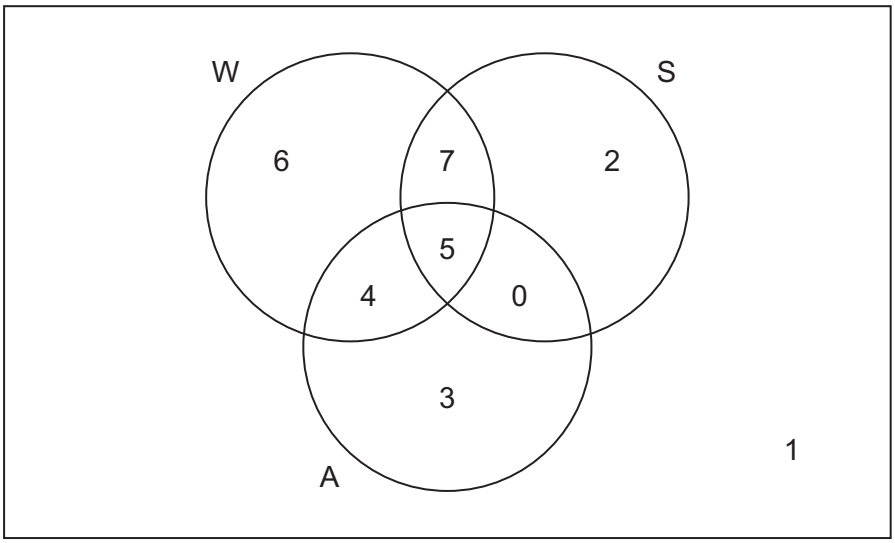
11

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14 The Venn diagram shows information about local businesses in Kiveton.

It shows which, if any, of the following features each business has.

- website (W)
- social media presence (S)
- adverts in the local free newspaper (A)



14 (a) How many businesses are represented in the Venn diagram?

[1 mark]

Answer _____

14 (b) How many businesses have **exactly two** of the three features?

[1 mark]

_____

Answer _____

Do not write outside the box

14 (c) One business is chosen at random.

What is the probability it has a website?

[2 marks]

Answer _____

14 (d) A business with a social media presence is chosen at random.

Work out the probability that this business does **not** advertise in the local free newspaper.

[2 marks]

Answer _____

6

Turn over for the next question

Do not write outside the box

15 A deadly disease currently has no treatment.

A researcher develops a drug which she believes will treat the disease.

She suggests a statistical experiment to test her drug.

> Infect six people chosen at random with the disease.
> Give the drug to all six people.
> Record whether each person recovers or not.

15 (a) Write down **two** problems with the researcher's experiment.

[2 marks]

Problem 1 _____

_____

_____

Problem 2 _____

_____

_____

15 (b) The researcher carries out a more suitable experiment.

She writes an article for a magazine to highlight her results.

She gives the name of each patient in the experiment and records how they responded to the drug.

The magazine editor asks the researcher to rewrite her article.

Explain why.

[1 mark]

_____

_____

3

END OF QUESTIONS

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

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