A

AQA

Surname _____

Other Names _____

Centre Number _____

Candidate Number _____

Candidate Signature _____

I declare this is my own work.

GCSE STATISTICS

F

8382/1F

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.**

At the top of the page, write your surname and other names, your centre number, your candidate number and add your signature.

[Turn over]

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INSTRUCTIONS

- **Use black ink or black ball-point pen. Draw diagrams in pencil.**

- **Answer ALL questions.**

- **You must answer the questions in the spaces provided. Do not write on blank pages.**

- **Do all rough work in this book. Cross through 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.**

DO NOT TURN OVER UNTIL TOLD TO DO SO

Answer ALL questions in the spaces provided.

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]

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

1

[Turn over]

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

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]**

_____

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[Turn over]

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 _____

_____

_____

_____

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[Turn over]

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

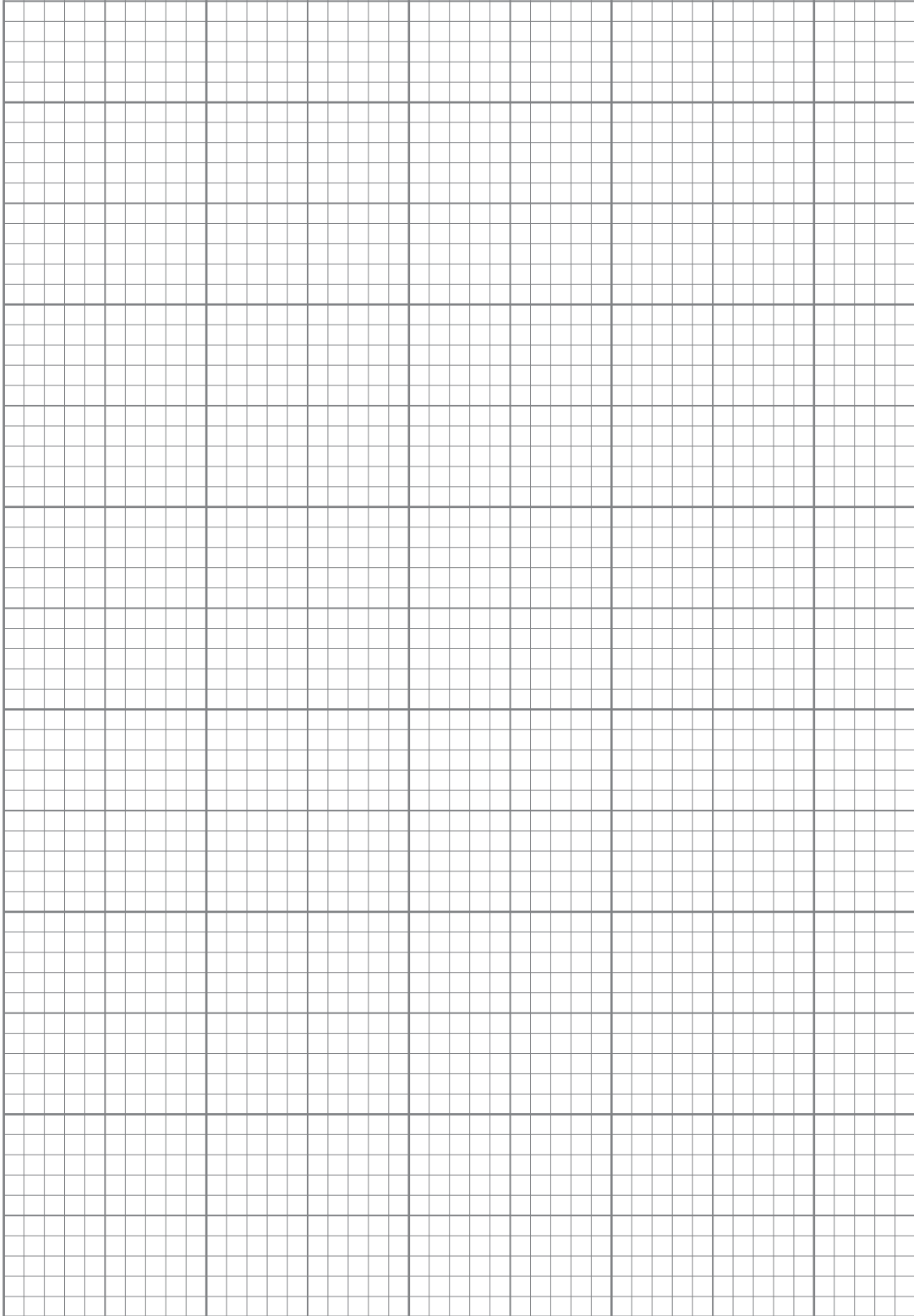**6 (b) (i)** There is only one type of average available for the data.

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]

13

6 (c) **Using these data, write an appropriate conclusion for the hypothesis in PART (a). [1 mark]**

_____

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11

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[Turn over]

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]

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[Turn over]

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]

_____

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7 (d) Using 1966 as base, calculate the index number for the average cost of a car in 1991 in YORKSHIRE. [2 marks]

_____

_____

_____
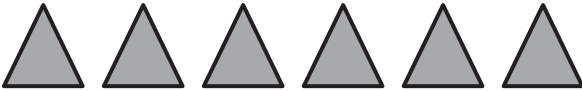
_____

_____

Answer _____

9

[Turn over]

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]

_____

_____

_____

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_____

4

[Turn over]

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 _____

[Turn over]

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]**

_____

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_____

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_____

[Turn over]

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

What does that mean in this context?
[1 mark]

_____

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_____

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]**

_____

_____

_____

[Turn over]

2 7

9 (f) (iv) **Describe ONE strategy to overcome the issue you said might arise in PART (iii). [1 mark]**

_____

_____

_____

14

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[Turn over]

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]**
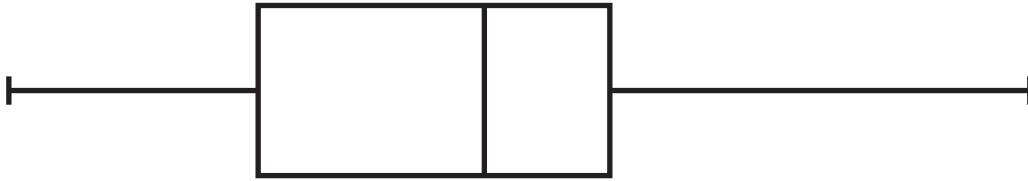
         Answer _____

         and _____
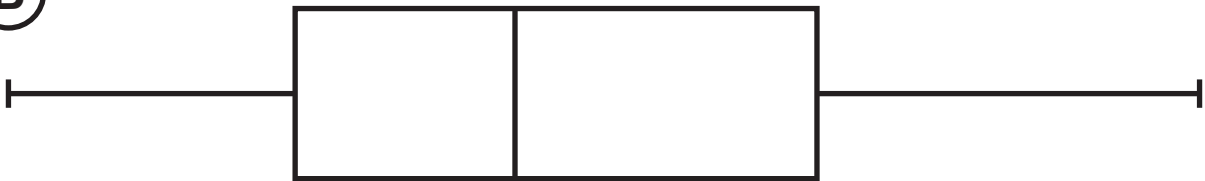
5

[Turn over]

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

(A)

(B)

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
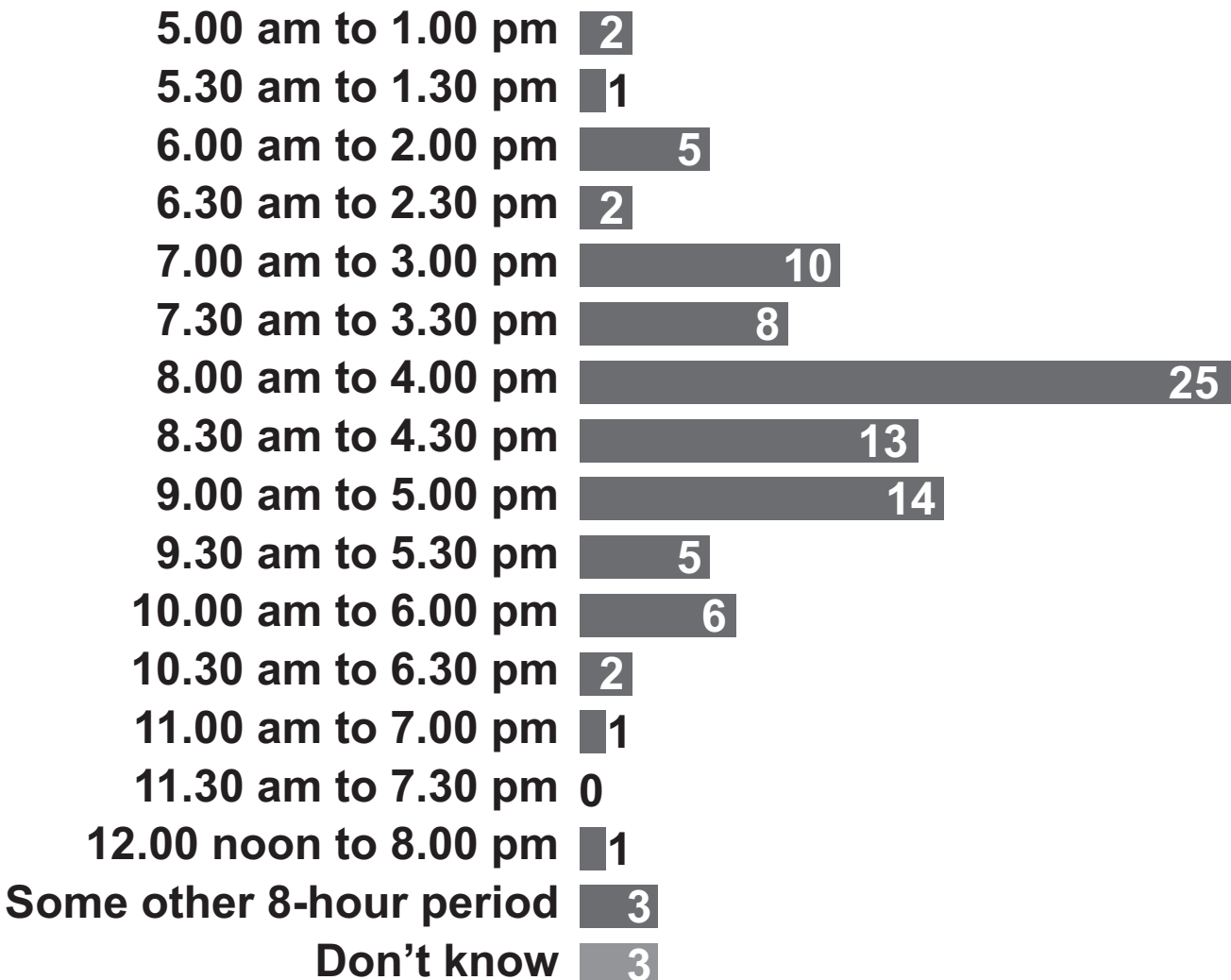
4

[Turn over]

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.

Period	Percentage
5.00 am to 1.00 pm	2
5.30 am to 1.30 pm	1
6.00 am to 2.00 pm	5
6.30 am to 2.30 pm	2
7.00 am to 3.00 pm	10
7.30 am to 3.30 pm	8
8.00 am to 4.00 pm	25
8.30 am to 4.30 pm	13
9.00 am to 5.00 pm	14
9.30 am to 5.30 pm	5
10.00 am to 6.00 pm	6
10.30 am to 6.30 pm	2
11.00 am to 7.00 pm	1
11.30 am to 7.30 pm	0
12.00 noon to 8.00 pm	1
Some other 8-hour period	3
Don't know	3

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]**

_____

_____

_____

_____

_____

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]**

_____

_____

_____

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[Turn over]

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 _____

[Turn over]

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

[Turn over]

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)
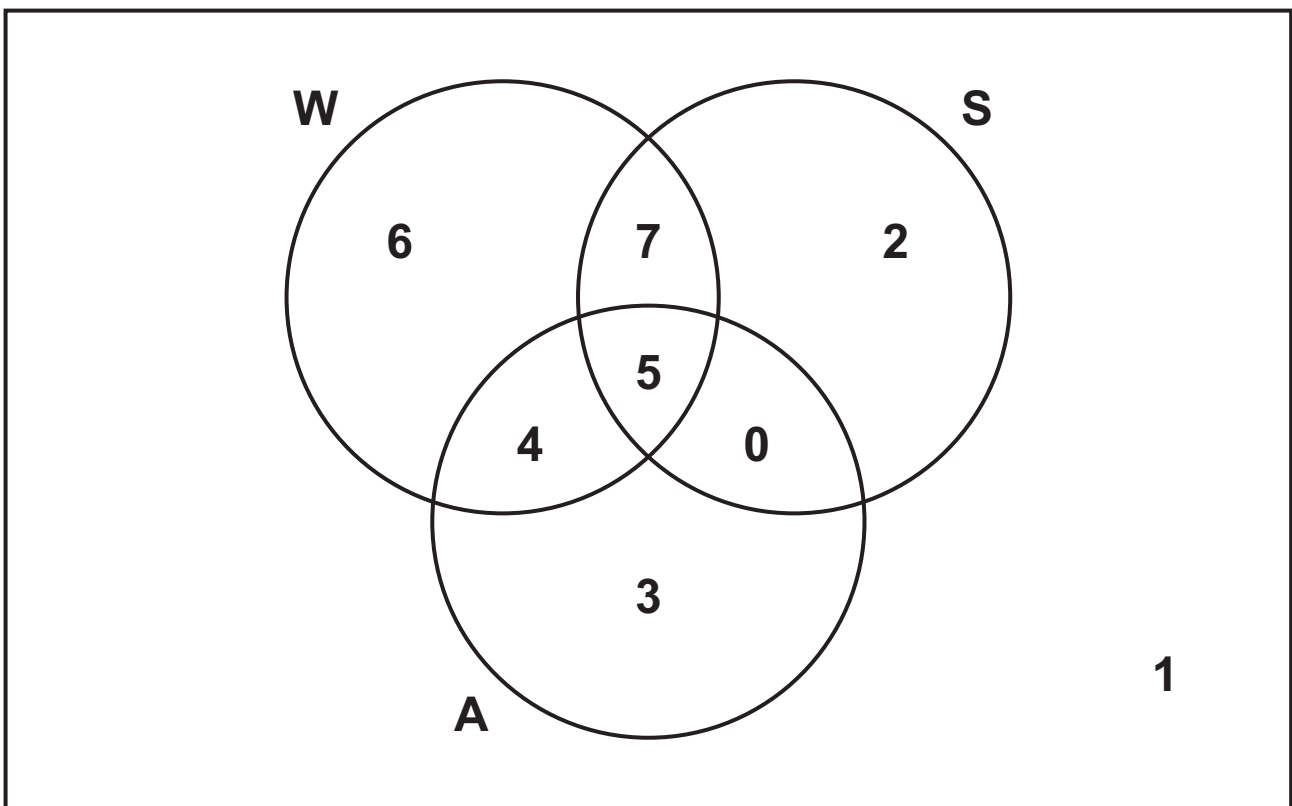
14 (a) How many businesses are represented in the Venn diagram? [1 mark]

Answer _____

14 (b)   **How many businesses have
EXACTLY TWO of the three features?
[1 mark]**

_____

_____

Answer _____

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 |

4 3

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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