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

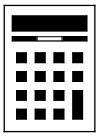
Foundation tier Paper 2

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
1-4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
14	
15	
16	
17	
TOTAL	

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

Do not write outside the box

1 A set of data is ordered from smallest to largest.

What is the name given to the measure that is one quarter along the ordered data?

Circle your answer.

[1 mark]

range lower quartile upper quartile median

2 Look at these sets of data.

A 2, 4, 5, 5, 7, 8

B 0, 5, 3, 6, 1, 4

C 9, 8, 7, 7, 6, 5

D 5, -1, 3, 2, 0, 1

Circle the letter below for the data set which has a **different range** to the others.

[1 mark]

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

Do not write outside the box

3 The probability that a biased coin lands on heads is $\frac{2}{5}$

Circle the probability that this coin lands on tails.

[1 mark]

0.5 $\frac{2}{5}$ $\frac{3}{5}$ 40%

4 Which of these diagrams could be suitable for displaying raw discrete data?
Circle your answer.

[1 mark]

frequency polygon cumulative frequency curve

equal width histogram stem-and-leaf diagram

4

Turn over for the next question

Do not write outside the box

5 The table shows the annual sales value (£ million) in the UK of different ways to buy music.

		Annual sales value (£ million)		
		Physical (eg CD)	**Downloads**	**Streaming**
Year	**2013**	544	397	106
	2014	517	338	168
	2015	513	293	254
	2016	475	215	407
	2017	459	165	602
	2018	383	123	829

5 (a) Write down the value of Downloads in 2015.

[1 mark]

£ _____ million

5 (b) In which year was the largest difference in the sales of Physical and Downloads?

[2 marks]

_____

_____

_____

_____

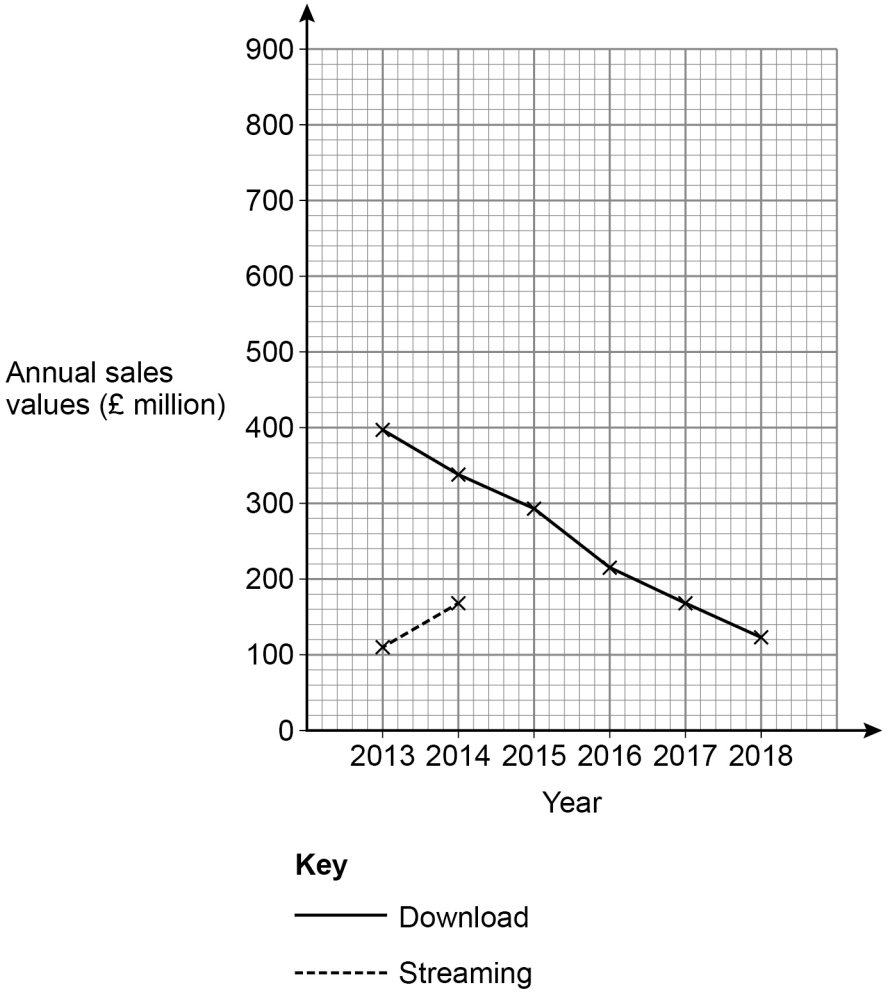
Answer _____

Do not write outside the box

5 (c) The graph shows the values for Downloads and some of the values for Streaming.

Use the values for **Streaming** from the table to complete the graph.

[2 marks]



5 (d) Make **two** comments about the trends shown on the graph.

[2 marks]

Comment 1 _____

_____

_____

Comment 2 _____

_____

_____

7

Turn over ►

Do not write outside the box

6 A vet keeps records of the mass and height of each animal he has registered.

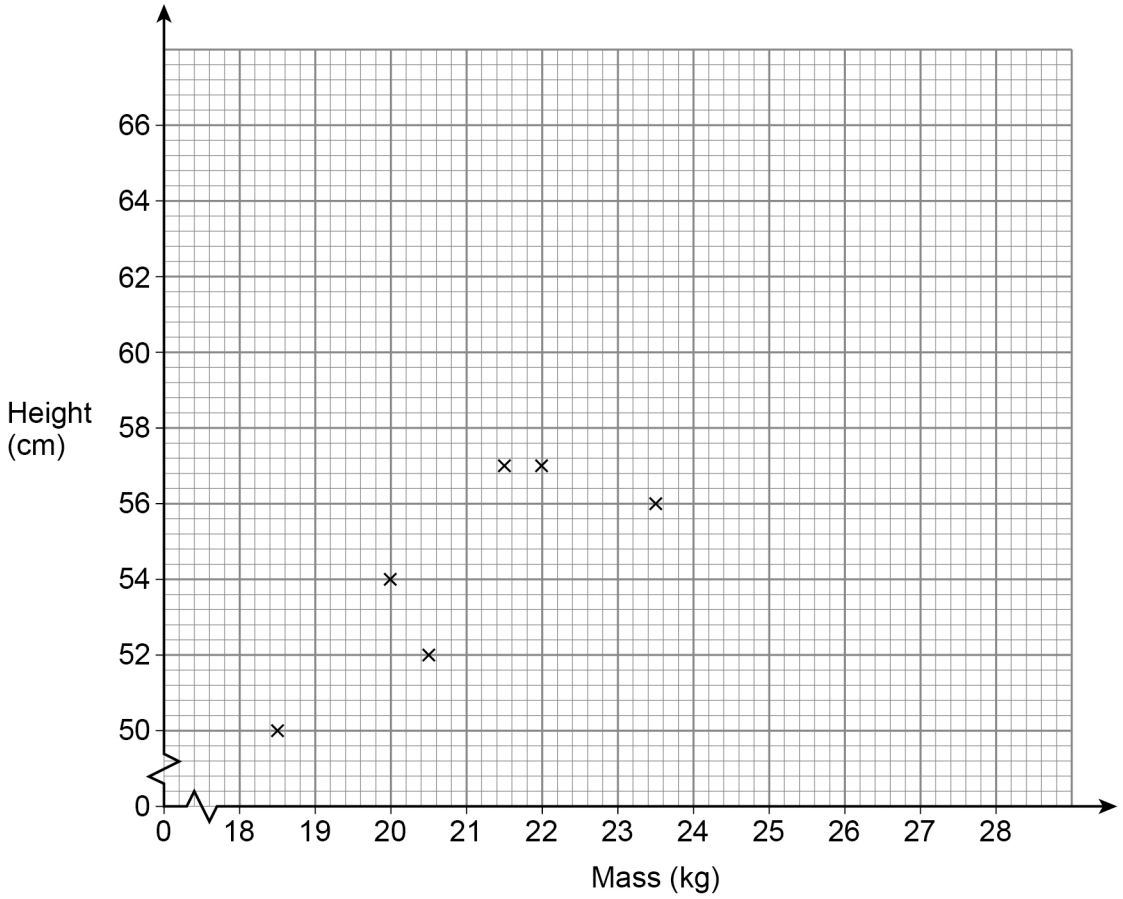
The table shows the masses and heights of 9 adult dogs which are of the Vizsla breed.

Mass (kg)	18.5	20	20.5	21.5	22	23.5	26.5	27	27.5
Height (cm)	50	54	52	57	57	56	65	65	66

6 (a) The scatter graph shows the information for the first 6 dogs.

Complete the diagram, plotting the points for the last 3 dogs.

[1 mark]



Do not write outside the box

6 (b) The mean mass of these 9 Vizslas is 23 kg

Calculate their mean height.

[2 marks]

Answer _____ cm

6 (c) Use the values from **part 6(b)** to help you draw a line of best fit on the diagram.

[2 marks]

6 (d) A new adult Vizsla dog comes to the vet.

The dog has a mass of 25 kg

Estimate the height of this dog.

[1 mark]

Answer _____ cm

6 (e) Another adult dog comes to the vet.

It has a mass of 19 kg and a height of 38 cm

Is it likely to be a Vizsla?

Tick (✓) a box.

[2 marks]

Yes ☐ No ☐ Cannot tell ☐

Give a reason for your answer.

_____

_____

_____

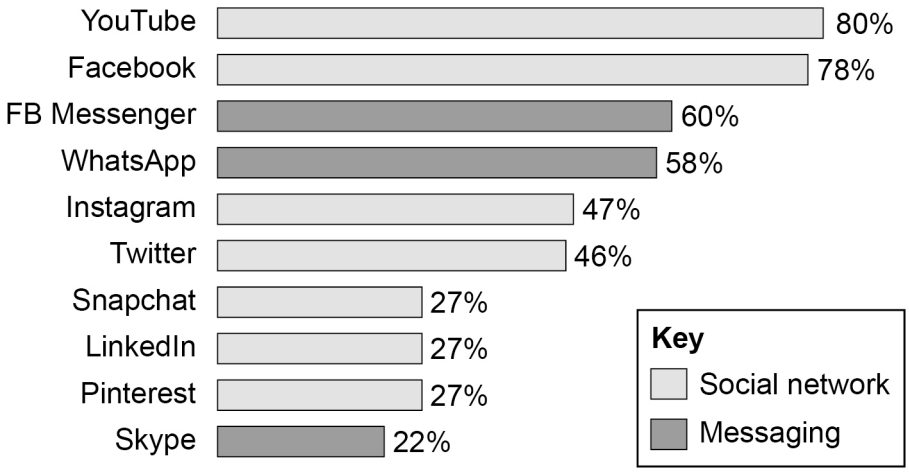
8

Turn over ►

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7 The graph shows information about the UK's most popular social media in 2019.

Percentage of the UK population who report using each platform



Source: Adapted from Hootsuite

7 (a) Which was the **second** most popular **messaging** platform in the UK in 2019?

[1 mark]

Answer _____

7 (b) The population of the UK in 2019 was approximately 68 million.

Simran said,

"Nearly 55 million people used YouTube in the UK in 2019 and were on it every day."

7 (b) (i) Comment on this part of Simran's statement.

"Nearly 55 million people used YouTube in the UK in 2019…"

[3 marks]

Do not write outside the box

7 (b) (ii) Comment on this part of Simran's statement,

"…and were on it every day."

[1 mark]

5

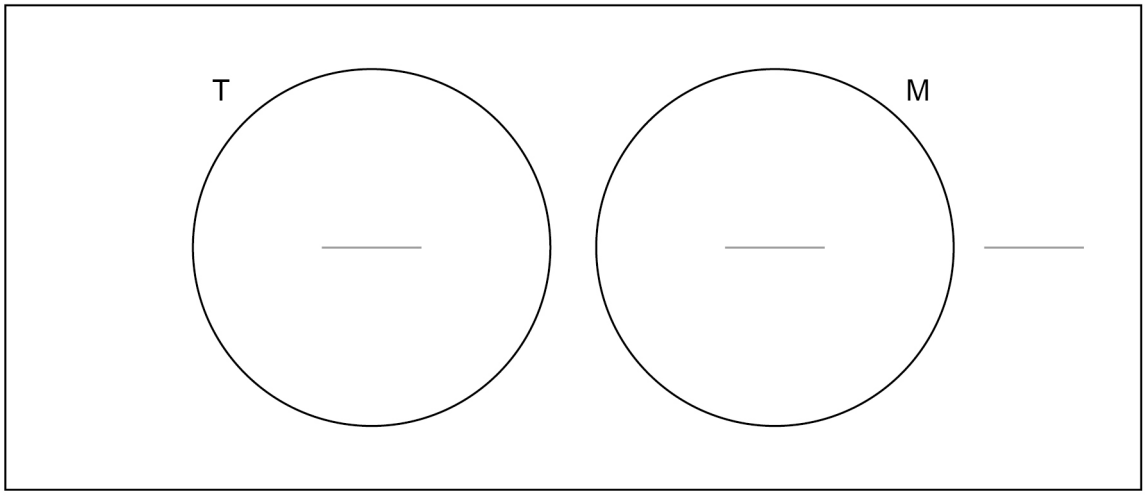
8 100 students go to London for a weekend on a school trip.

8 (a) On one afternoon, students can choose to go to a theatre (T) **or** visit a museum (M) **or** do neither.

- 16 chose to do neither.
- Three times as many chose the theatre as chose the museum.

Complete the Venn diagram.

[3 marks]



8 (b) One student is chosen at random.

What is the probability that they go to the museum?

[1 mark]

Answer _____

4

Turn over ►

Do not write outside the box

9 Sanders owns a chicken farm where the chickens can roam freely.

He is investigating where the chickens tend to go in their field.

He,

- divides the field up into 9 squares
- counts the number of chickens in each square.

Here are the raw data showing how many chickens are in each square.
There is a food tray in the bottom right square.

3	11	7
11	22	25
13	34	42 FOOD TRAY

9 (a) What is the probability that a chicken, chosen at random, is in the square with the food tray?

[2 marks]

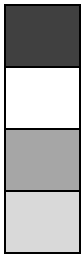
Answer _____

Do not write outside the box

9 (b) Sanders draws this choropleth map to represent the number of chickens in each square.



Key:



0 – 9 chickens

11 – 19 chickens

21 – 29 chickens

31 – 39 chickens

Write down **three** errors that Sanders has made.

[3 marks]

Error 1 _____

_____

_____

Error 2 _____

_____

_____

Error 3 _____

_____

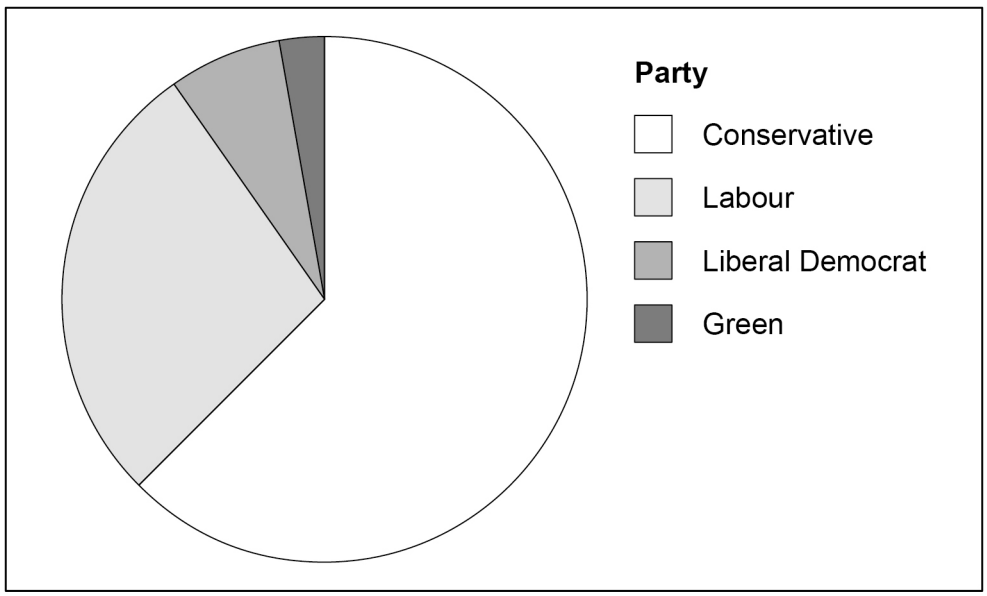
_____

5

Turn over ►

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10 The pie chart shows information about how people voted in the Dartford area during the 2019 General Election.



10 (a) Which party had the most votes?

[1 mark]

10 (b) 54 000 people are represented in the pie chart.

Work out how many of them voted for Labour.

[3 marks]

Answer _____

4

Do not write outside the box

11 The table shows information about the heights of a sample of 100 trees in a forest.

Height, h (m)	Frequency
$0 < h \leqslant 5$	8
$5 < h \leqslant 10$	23
$10 < h \leqslant 15$	40
$15 < h \leqslant 20$	19
$20 < h \leqslant 25$	10

11 (a) Complete the table below to show the cumulative frequencies for the data.

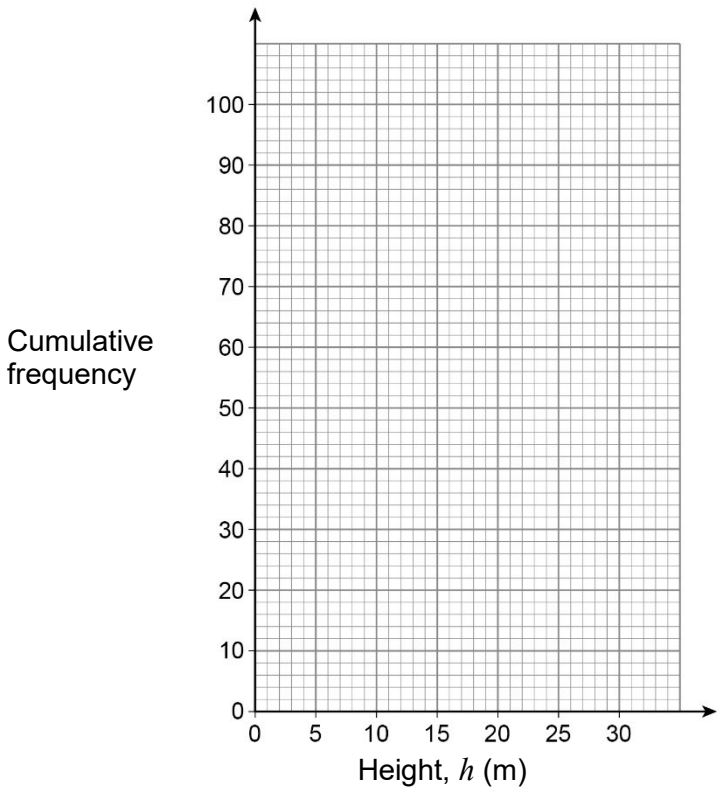
[2 marks]

Height, h (m)	Frequency
$0 < h \leqslant 5$	8
$5 < h \leqslant 10$	23
$10 < h \leqslant 15$	40
$15 < h \leqslant 20$	19
$20 < h \leqslant 25$	10

Height, h (m)	Cumulative frequency
$h \leqslant 5$	8
$h \leqslant 10$	
$h \leqslant 15$	
$h \leqslant 20$	
$h \leqslant 25$	100

11 (b) On the grid draw a cumulative frequency diagram for the data.

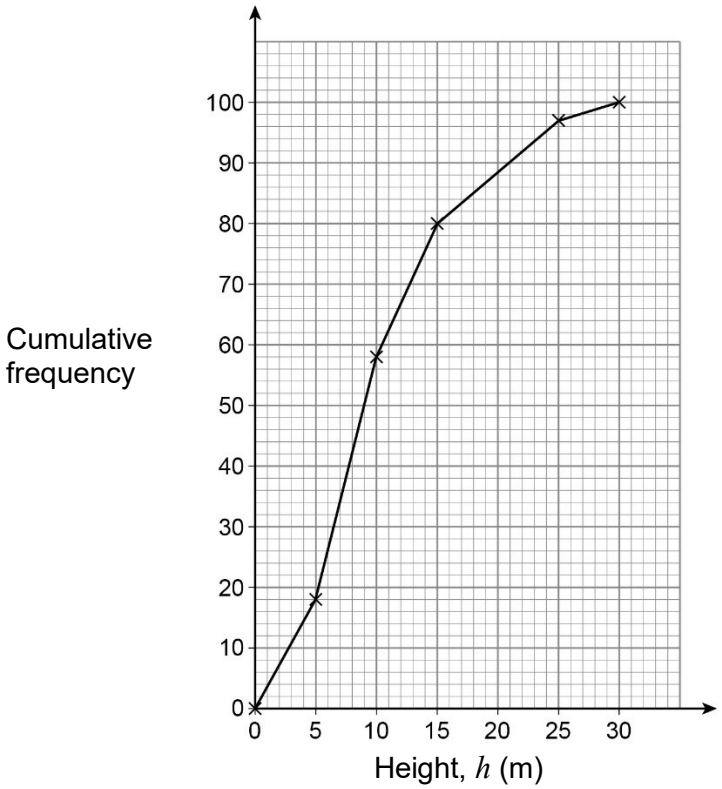
[3 marks]



Turn over ►

Do not write outside the box

11 (c) The cumulative frequency diagram below shows information about a sample of 100 trees in a **large field**.

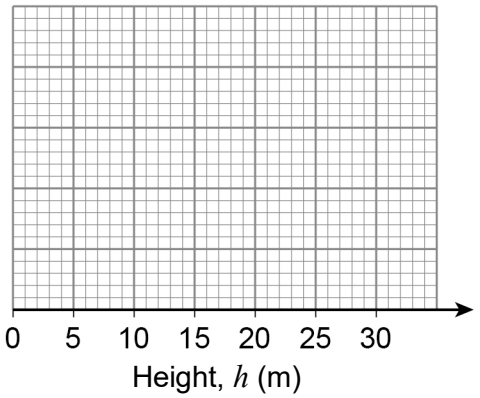


The shortest tree in the field is 1 m in height.

The tallest tree in the field is 27 m in height.

Use this information and the cumulative frequency diagram to complete a box plot for the trees in the field.

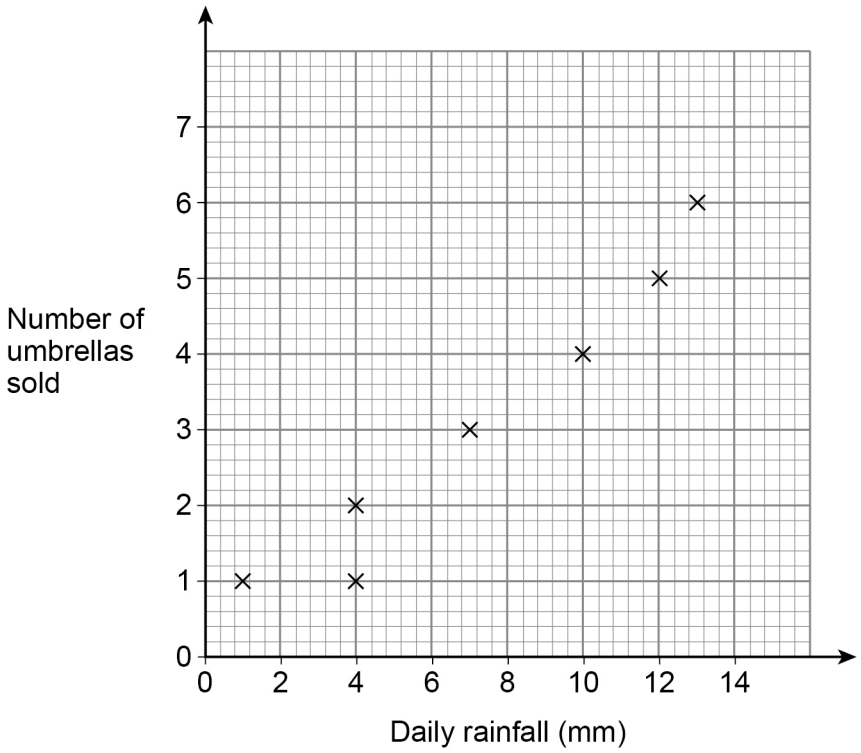
[4 marks]



9

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12 Caro has plotted this scatter diagram to show the numbers of umbrellas she sold against the amount of rain that fell each day.



12 (a) Caro can see from the scatter diagram that the greater the rainfall, the greater the number of umbrellas sold.

Tess says that if Caro sells more umbrellas, there will be greater rainfall.

Give a reason why Tess is **not** correct.

[1 mark]

Question 12 continues on the next page

Do not write outside the box

12 (b) The weather forecast for tomorrow suggests that there will be 20 mm of rain throughout the day.

Caro says she can use the scatter diagram to predict how many umbrellas she would sell if the rainfall was 20 mm.

Is she correct?

Tick (✓) a box.

[1 mark]

Yes ☐ No ☐

Give a reason for your answer.

_____

_____

_____

2

13 In Vikram's village, there are 600 people.

He has sampled 50 of them.
32 of this sample would like a gym to be built.
Assume the sample is representative.

How many people would you expect, from the whole village, would like a gym to be built?

Circle your answer.

[1 mark]

32 192 216 384

1

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14 Each week Tracey bakes cupcakes for a market stall.

Tracey tries to draw an ordered stem and leaf diagram to show the number of cupcakes she bakes for the last 15 weeks.

2	9	4	6	2	7
3	4	4	1	4	
4	7	1	2	3	
6	0	4			

Key: 2 | 4 represents 24 cupcakes

14 (a) The data values are correct, but Tracey has made **two** errors.

What are the errors?

[2 marks]

Error 1 _____

_____

_____

Error 2 _____

_____

_____

14 (b) It is still possible to correctly work out the median number of cupcakes from the stem and leaf diagram.

Work out this median.

[2 marks]

_____

_____

_____

Answer _____

4

Do not write outside the box

15 Look at the data below.

Confirmed cases of measles, mumps and rubella in England and Wales: 1996 to 2018.

The values in the brackets are for **England only**.

Year	Measles	Mumps	Rubella
1996	112 (112)	94 (93)	3922 (3567)
1997	177 (177)	182 (172)	117 (113)
1998	56 (55)	121 (118)	119 (117)
1999	92 (92)	373 (371)	162 (159)
2000	100 (99)	730 (721)	62 (61)
2001	70 (67)	784 (731)	45 (41)
2002	320 (316)	500 (394)	64 (64)
2003	440 (396)	1541 (1086)	16 (14)
2004	193 (183)	8129 (7321)	14 (14)
2005	76 (76)	43 378 (39 621)	29 (27)
2006	711 (707)	4420 (4128)	34 (34)
2007	934 (921)	1476 (1462)	35 (35)
2008	1315 (1280)	2405 (2348)	27 (27)
2009	1141 (982)	7662 (7301)	9 (9)
2010	377 (369)	3965 (3880)	12 (12)
2011	1085 (1063)	2372 (2299)	4 (4)
2012	2032 (1920)	2680 (2592)	65 (65)
2013	1836 (1414)	4265 (3752)	13 (13)
2014	121 (102)	3094 (2680)	3 (3)
2015	91 (91)	830 (761)	5 (5)
2016	541 (526)	573 (537)	2 (2)
2017	283 (265)	1840 (1796)	3 (3)
2018	989 (968)	1088 (1061)	3 (3)

Source: GOV.UK

Do not write outside the box

15 (a) Write down the last year in which there was a confirmed case of rubella in **Wales**.

[1 mark]

Answer _____

15 (b)

$$\text{Mumps rate} = \frac{\text{Number of confirmed cases}}{\text{Total population}} \times 1000$$

The population of **England** in 2011 was estimated by the census to be 53 012 456

Show that the mumps rate for England in 2011 was 0.043 to 3 decimal places.

[3 marks]

_____

_____

_____

_____

4

Turn over for the next question

Do not write outside the box

16 Here is an experiment which is designed to find the best trained dog out of Troy, Buddy, Bruno, Murphy and Bumble.

- Each of the five owners asks their dog to sit and then walks away.
- The time for which each dog sits is recorded.

The experiment is repeated 4 more times.

16 (a) Here are the data for the five dogs.

	Time for which each dog sits (nearest second)				
Dog	**Experiment 1**	**Experiment 2**	**Experiment 3**	**Experiment 4**	**Experiment 5**
Troy	15	18	19	13	13
Buddy	21	22	14	20	12
Bruno	39	20	17	12	12
Murphy	24	17	18	2	24
Bumble	7	12	14	12	10

The dog which sits for the longest **average** time is declared the winner.

Give a reason why each of the three dogs stated on the next page could be declared the winner.

In each answer you **must** state or calculate appropriate measures.

[6 marks]

Do not write outside the box

Buddy

Bruno

Murphy

16 (b) Give **one** reason why this experiment is unlikely to have high validity.

[1 mark]

7

Turn over for the next question

Do not write outside the box

17 HS2 (High Speed 2) is a faster train service that will link major cities in England.

Tom believes most people are against HS2 because it affects countryside and housing along its routes.

He decides to gather opinions about HS2.

17 (a) Write down a hypothesis Tom could use for his study.

[1 mark]

17 (b) Here is one of the questions from Tom's study.

How old are you?

Tick (✓) a box.

☐ under 21 ☐ 21 – 50 ☐ 51 – 60 ☐ 61 – 70

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

[2 marks]

Problem 1 _____

Problem 2 _____

17 (c) Here is an open question from Tom's study.

How much do you earn? £ _____

Write down a problem with this question.

[1 mark]

Do not write outside the box

17 (d) Tom reads that HS2 will link 29 stations.

He decides to take a random sample of 5 of the stations where he can ask people for their opinions.

Briefly describe a way Tom could achieve this.

[2 marks]

17 (e) One of the stations Tom gets in his random sample is Manchester Piccadilly.

To find opinions, he goes there one Saturday afternoon and asks his questions to the first 100 people who will answer.

17 (e) (i) Name this sampling method.

[1 mark]

Answer _____

17 (e) (ii) What is good about Tom finding opinions in this way?

[1 mark]

17 (e) (iii) What is not so good about Tom finding opinions in this way?

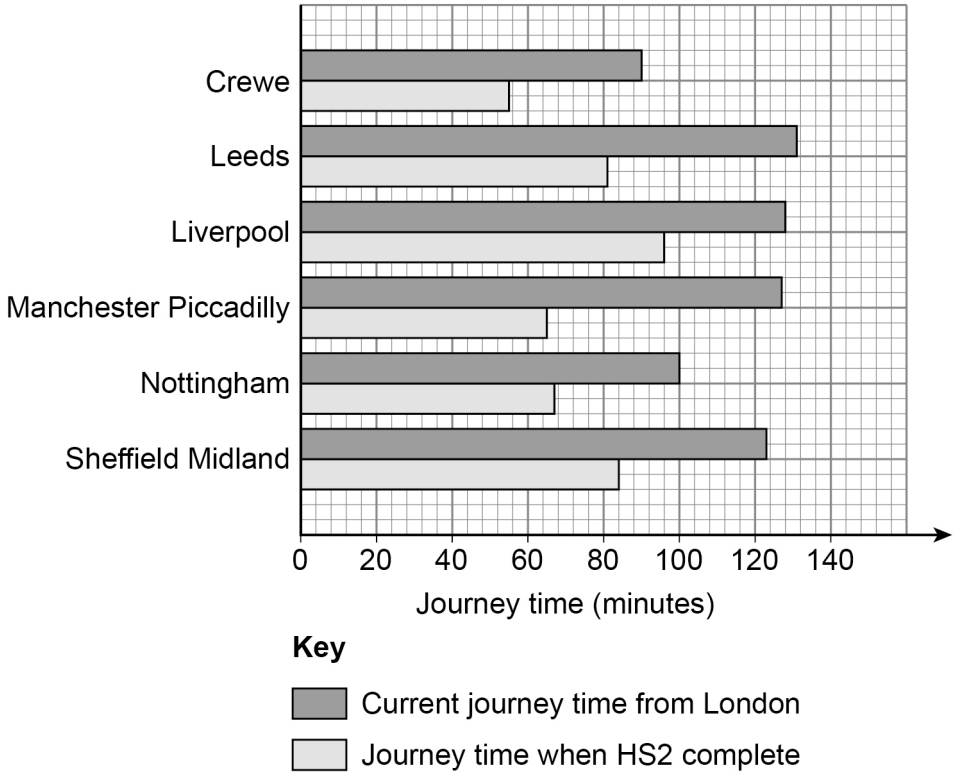
[1 mark]

17 (e) (iv) Give a reason why Tom should also find opinions of people where HS2 will **not** have a station.

[1 mark]

Do not write outside the box

17 (f) The Department of Transport produced this graph about HS2 in 2016 showing how journey times might change when HS2 is complete.



17 (f) (i) Write down the name of this type of diagram.

[1 mark]

Answer _____

Do not write outside the box

17 (f) (ii) Li Na says that the journey time between London and Manchester Piccadilly will be reduced by about an hour.

Is Li Na correct?

Tick (✓) a box.

Yes ☐ No ☐

Show working to justify your answer.

[2 marks]

17 (g) This table also shows information about reduced journey times from London.

London to:	Current journey time (mins)	Journey time after HS2 (mins)	Reduction time in minutes (% reduction)
Chesterfield	109	75	34 (31.2%)
Crewe	90	55	35 (38.8%)
Edinburgh	263	218	45 (17.1%)
Glasgow	272	218	54 (19.9%)
Liverpool	128	96	32 (25.0%)
Newcastle	172	139	33 (19.2%)
Preston	128	84	

Work out the missing time and percentage in the Preston row.

[3 marks]

Answer _____ mins _____ %

16

END OF QUESTIONS

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ANSWER IN THE SPACES PROVIDED



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