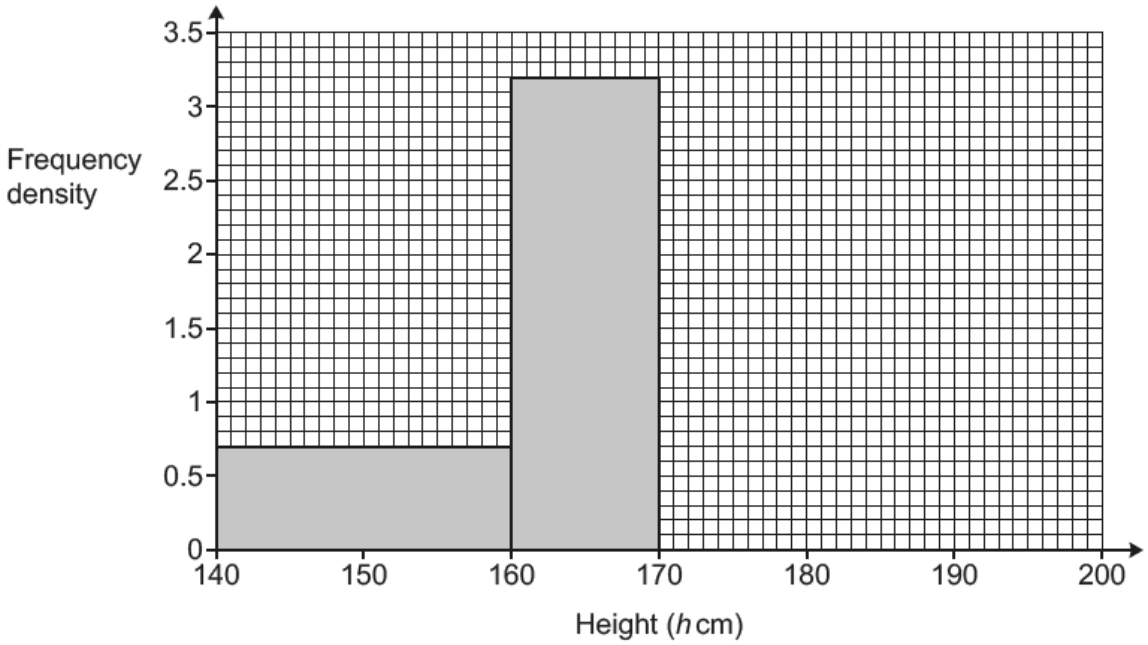
Statistics – 2021/20 GCSE Mathematics Higher

1. Nov/2021/Paper_J560/04/No.13

The height, h cm, of each member of a tennis club is recorded.
The histogram shows some of the results.



40% of the members have a height in the interval $160 \leqslant h < 170$.
30% of the members have a height in the interval $170 \leqslant h < 180$.
100% of the members have a height in the interval $140 \leqslant h < 200$.

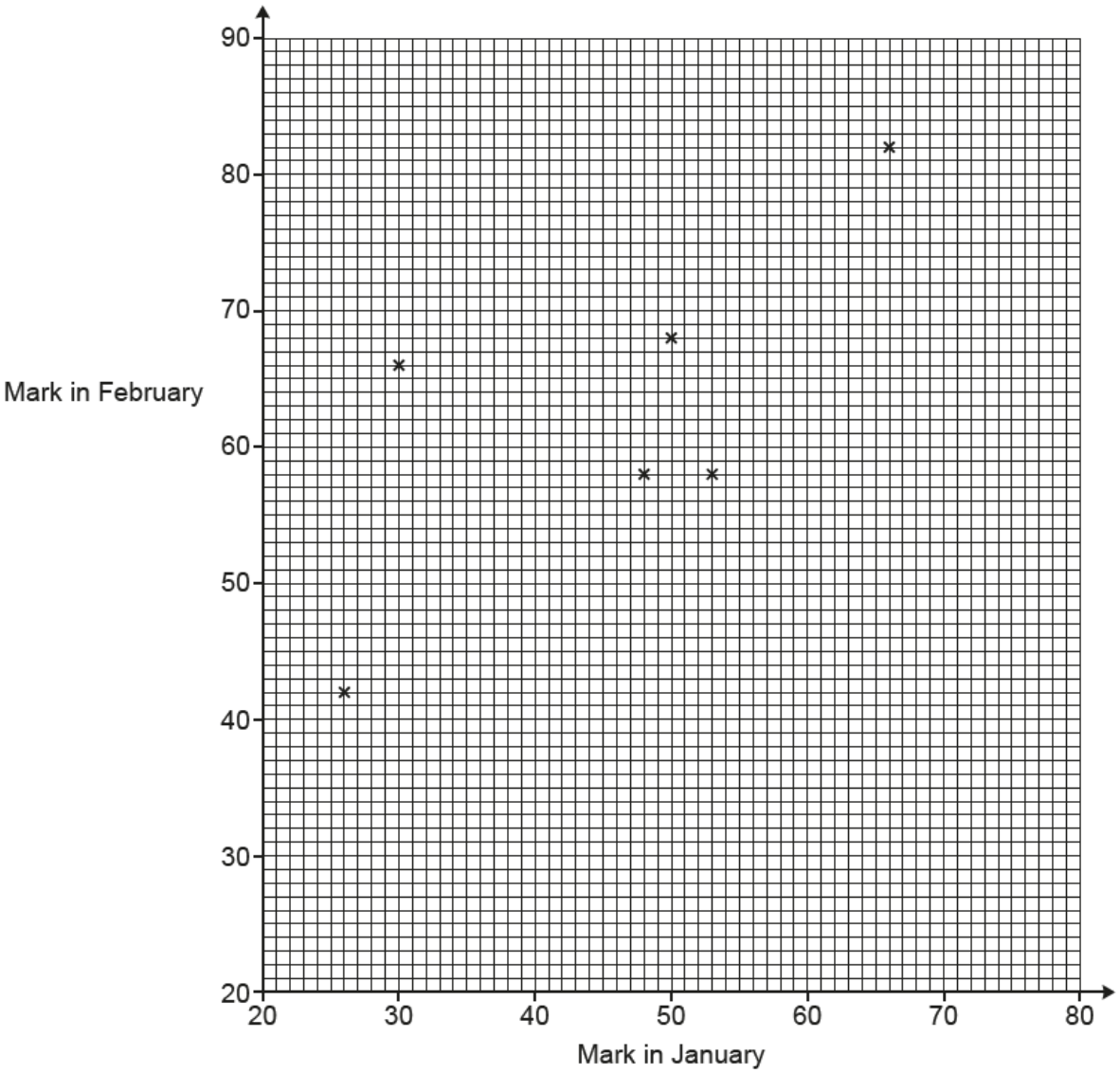
Complete the histogram for the intervals $170 \leqslant h < 180$ and $180 \leqslant h < 200$. **[6]**

2. Nov/2021/Paper_J560/05/No.4

The table shows the marks obtained by 10 students in spelling tests in January and February.

Mark in January	26	53	50	48	30	66	70	44	37	38
Mark in February	42	58	68	58	66	82	86	60	48	50

The marks for the first six students are plotted on the scatter diagram.



(a) Plot the marks for the remaining four students. **[2]**

(b) Describe the type of correlation shown in the completed scatter diagram.

..... **[1]**

(c) **(i)** On the scatter diagram, **circle** the student that made the greatest improvement in their marks from January to February. **[1]**

(ii) Work out the percentage change in this student's marks from January to February.

(c)(ii) ..... % **[3]**

(d) Another student, Kai, scored 79 marks in the test in January but was absent for the test in February.

Kai says

I could use a line of best fit on the scatter diagram to estimate the marks I may have achieved in the test in February.

Is Kai's method reliable?
Give a reason for your answer.

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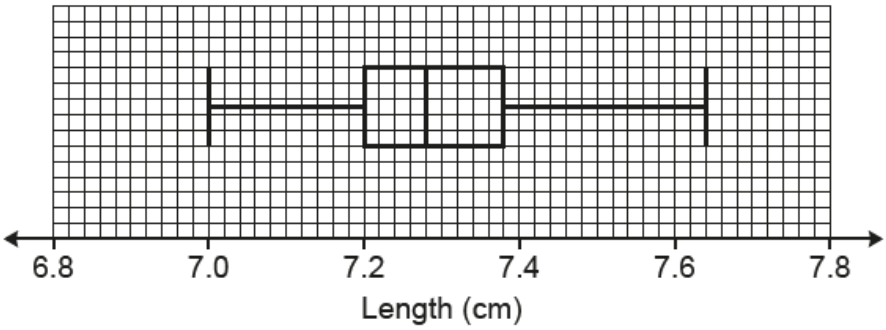
..... **[1]**

3. Nov/2021/Paper_J560/05/No.12

The box plot shows the distribution of the lengths, in cm, of 60 full-grown mice owned by a pet shop.



(a) Find the range.

(a) .....cm **[2]**

(b) Work out the number of these mice that have a length of at least 7.2 cm.

(b) ..... **[2]**

(c) Sam owns 5 full-grown mice.
Sam picks the third longest mouse and measures its length.
Sam then looks at the box plot.

Sam says

This mouse is 7.35cm long.
Therefore, the mice I own are longer than the full-grown mice owned by the pet shop.

(i) Give a mathematical reason to support Sam's conclusion.

.....

..... **[1]**

(ii) Give a mathematical reason why Sam's conclusion may be unreliable.

.....

..... **[1]**

4. Nov/2021/Paper_J560/06/No.5

Ling throws a six-sided dice 300 times.
The table shows the frequencies of their results.

(a) Complete the table to show the relative frequencies.

Number on dice	1	2	3	4	5	6
Frequency	42	27	57	60	39	75
Relative frequency			0.19			

[2]

(b) Ling thinks that the dice may be biased.

(i) Explain why evidence from the table could support their opinion.

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..... **[1]**

(ii) Explain why the dice may, in fact, **not** be biased.

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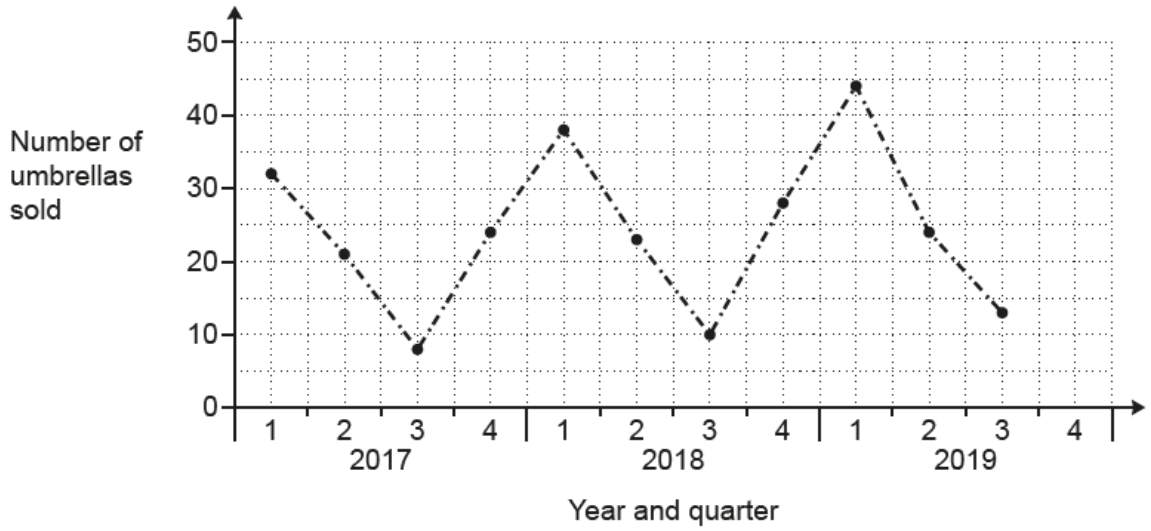
..... **[1]**

5. Nov/2020/Paper_J560/04/No.9

The graph shows the number of umbrellas sold in Ling's shop for each quarter from quarter 1 of 2017 to quarter 3 of 2019.



(a) The shop sold 32 umbrellas in quarter 4 of 2019.

Complete the graph. **[1]**

(b) Make one comment about the **seasonal** variation shown in this graph.

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..... **[1]**

(c) Make one comment about the **annual** variation shown in this graph.

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..... **[1]**

(d) Ling predicts that she will sell 50 umbrellas in quarter 1 of 2020.

What assumption has she made?

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..... **[1]**

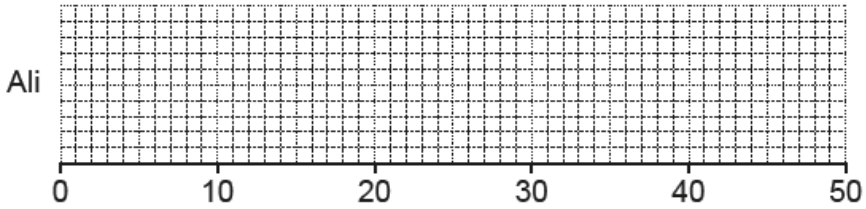
6. Nov/2020/Paper_J560/05/No.13

Ali and Beth take it in turns to play a computer game.
On each turn, the player achieves a score out of 50.
Ali and Beth play the computer game many times and record their scores.

(a) Ali's scores are summarised below.

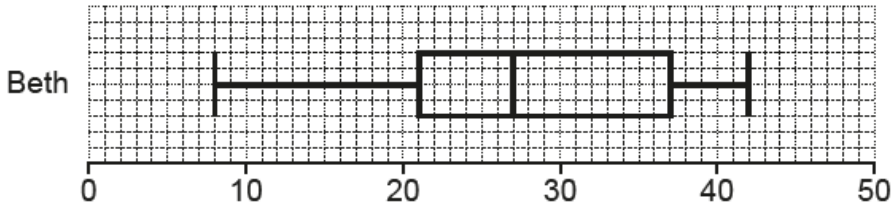
- median = 31
- highest score = 38
- range = 23
- lower quartile = 24
- interquartile range = 11

Draw a box plot to show the distribution of Ali's scores.



[3]

(b) This box plot shows the distribution of Beth's scores.



Find the interquartile range of Beth's scores.

(b) ..... **[2]**

(c) Kareem says

Beth was more consistent than Ali because Beth had a lower median score.

Is his statement correct?
Explain your reasoning.

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..... **[2]**

7. Nov/2020/Paper_J560/05/No.16

(a) The masses, $m$kg, of some parcels are shown below.

4 15 14 11 12 3 1 18 13 2 16 10

Jack constructs this grouped frequency table to record the masses.

Mass ($m$kg)	Tally	Frequency
$0 \leqslant m \leqslant 5$		
$5 \leqslant m \leqslant 10$		
$10 \leqslant m \leqslant 15$		
$15 \leqslant m \leqslant 20$		

Explain why Jack's table is unsuitable to record the masses.

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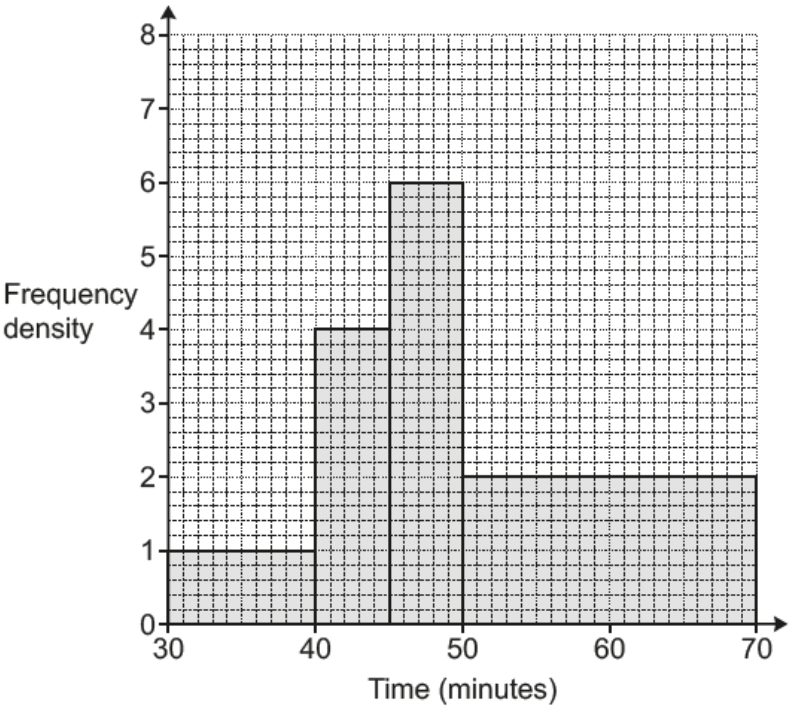
..... **[1]**

(b) The histogram summarises the times taken, in minutes, by some students to complete a race.



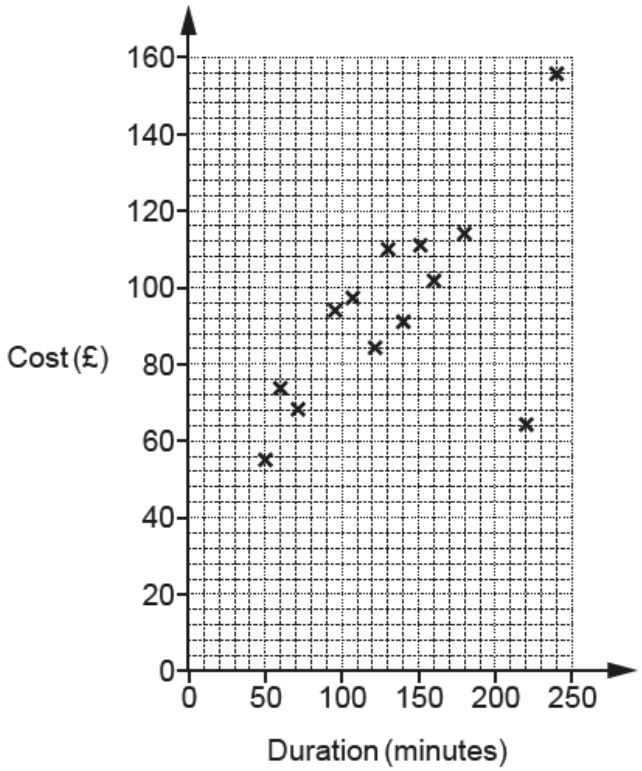
(i) Show that 70 students took between 45 and 70 minutes to complete the race. **[2]**

(ii) Calculate an estimate of the mean time taken to complete the race.
Show your working.

(b)(ii) .....min **[5]**

8. Nov/2020/Paper_J560/06/No.1

A travel agent records the duration and cost of the 15 flights he sold on one day.
The data for the first 13 flights are plotted on the scatter diagram.



(a) The data for the final two flights is:

Duration	210 minutes	1 hour 40 minutes
Cost	£130	£80

Plot these flights on the scatter diagram. **[2]**

(b) The cost of one of the 15 flights had been discounted in a sale.

Circle the most likely flight on the scatter diagram. **[1]**

(c) **(i)** Draw a line of best fit on the scatter diagram. **[1]**

(ii) Use your line of best fit to estimate the duration of a flight costing £90.

(c)(ii) ..... minutes **[1]**

(d) Explain why the travel agent should not use his records to estimate the cost of a 7 hour flight.

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..... **[1]**