Your notes

GCSE Statistics: revision notes

Cumulative frequency and box plots

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Cumulative frequency

- **Cumulative frequency** is a running total of the frequencies.
- Plot each **cumulative frequency** at the upper class boundary, then join the points with a smooth curve or straight lines. Start from the lower boundary of the first class at zero.
- The total frequency (n) is the last **cumulative frequency**.

Median, quartiles and percentiles

- For large grouped data, read estimates from the graph: the **median** at n ÷ 2, the **lower quartile** (LQ) at n ÷ 4 and the **upper quartile** (UQ) at 3n ÷ 4.
- The **interquartile range** (IQR) = UQ – LQ. It measures the spread of the middle 50% and isn't affected by extreme values.
- **Percentiles** split the data into 100 parts and deciles into 10. The 90th **percentile** is read at 90% of n.
- To find how many values are above a value, read the **cumulative frequency** at that value and subtract it from n.

Box plots

- A **box plot** shows the five-number summary: minimum, LQ, **median**, UQ and maximum. Outliers can be marked with a cross.
- Example: minimum 12, LQ 20, **median** 25, UQ 32, maximum 45. The IQR is 12 and the range is 33.
- When comparing **box plots**, compare an average (the **median**) and a measure of spread (the IQR), and write about what they mean in context.

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Key terms

Cumulative frequency	A running total of the frequencies.
Median	The middle value when data is in order.
Lower quartile	The value one quarter of the way through ordered data.
Upper quartile	The value three quarters of the way through ordered data.
Interquartile range	Upper quartile minus lower quartile.
Box plot	A diagram showing the minimum, quartiles, median and maximum.
Percentile	A value below which a given percentage of the data falls.

Quick questions

Cover the answers and test yourself: remembering is what makes it stick.

1. Where do you plot points on a cumulative frequency graph?
2. With 80 values, where do you read the median on a cumulative frequency graph?
3. With 80 values, where do you read the upper quartile?
4. The LQ is 20 and the UQ is 32. What is the interquartile range?
5. What does a box plot show?
6. Why is the IQR better than the range when there are extreme values?
7. Frequencies are 5, 12, 18 and 5. What is the cumulative frequency of the third class?
8. 120 people are in a survey and the cumulative frequency at 40 minutes is 84. How many took more than 40 minutes?

Answers

1. At the upper class boundaries
2. At a cumulative frequency of 40
3. At a cumulative frequency of 60
4. 12
5. Minimum, lower quartile, median, upper quartile and maximum
6. It isn't affected by extreme values
7. 35
8. 36

What to do next

Practise 10 questions on this topic

Try 3 exam questions, with mark schemes

Read the lesson, one step at a time

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