Your notes

GCSE Statistics: revision notes

Measures of spread

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Range and interquartile range

- The **range** = largest value – smallest value. It is easy to find but affected by extreme values.
- The **interquartile range** (IQR) = UQ – LQ. It measures the spread of the middle 50% and is not affected by extreme values.
- The **interdecile range** = 9th decile – 1st decile. It covers the middle 80%. Interpercentile **ranges** work the same way.

Standard deviation

- **Standard deviation** measures how spread out values are around the mean. It uses every value.
- **Standard deviation** = $\sqrt{(\Sigma x^2 \div n - \text{mean}^2)}$. **Variance** is the **standard deviation** squared.
- Example: 2, 4, 4, 4, 5, 5, 7, 9. The mean is 5 and $\Sigma x^2 = 232$. $232 \div 8 = 29$, then $29 - 25 = 4$, and $\sqrt{4} = 2$.
- From summary values: $n = 10$, $\Sigma x = 50$ and $\Sigma x^2 = 340$ give a mean of 5 and a **standard deviation** of $\sqrt{(34 - 25)} = 3$.
- For a frequency table, use $\sqrt{(\Sigma fx^2 \div \Sigma f - \text{mean}^2)}$. Calculators in statistics mode can find it directly.

Interpreting spread

- A bigger **standard deviation** or IQR means the data is more spread out, so it is less **consistent**.
- Always compare in context, such as "Team A's scores were more **consistent** than Team B's because their **standard deviation** was smaller."

Key terms

Range	The largest value minus the smallest value.

Interquartile range	Upper quartile minus lower quartile.
Interdecile range	The 9th decile minus the 1st decile.
Standard deviation	A measure of how spread out values are around the mean.
Variance	The square of the standard deviation.
Consistent	Having values close together, with little spread.

Your notes

Quick questions

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

1. What is the range of 3, 8, 12, 15, 21?
2. What does the interquartile range measure?
3. What is the interdecile range?
4. $n = 10$, $\Sigma x = 50$ and $\Sigma x^2 = 340$. What is the standard deviation?
5. What is the standard deviation of 2, 4, 4, 4, 5, 5, 7, 9?
6. A set of data has standard deviation 5. What is the variance?
7. What does a small standard deviation show?
8. What is an advantage of standard deviation over the range?

Answers

1. 18
2. The spread of the middle 50%
3. The 9th decile minus the 1st decile
4. 3
5. 2
6. 25
7. The data is consistent and close to the mean
8. It uses every value

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

Free revision for GCSE and KS3 at lycolearn.co.uk. Some notes are for one exam board only, and say so in brackets.