Your notes

GCSE Statistics: revision notes

Lines of best fit, interpolation and extrapolation

Contents

1. Lines of best fit
2. The equation of the line
3. Making predictions
4. Key terms
5. Quick questions
6. What to do next

Lines of best fit

- A **line of best fit** shows the trend on a scatter diagram. Draw it with roughly equal numbers of points on each side.
- A **line of best fit** drawn by eye should pass through the **mean point** $(\bar{x}, \bar{y})$, found from the means of the two variables.
- Only draw a **line of best fit** when there is correlation.

The equation of the line

- A **line of best fit** has the equation $y = a + bx$. b is the **gradient** and a is the y-**intercept**.
- **Gradient** = change in y ÷ change in x. From (2, 10) to (6, 22), the **gradient** is 12 ÷ 4 = 3.
- Interpret the **gradient** in context: "for each extra hour of revision, the test score increases by about 3 marks."
- Interpret the **intercept** only if $x = 0$ makes sense: "a student who does no revision would score about 12."

Making predictions

- Substitute a value of x into the equation: if $y = 12 + 3x$ and $x = 4$, then $y = 24$.
- **Interpolation** is predicting within the range of the data. It is fairly reliable.
- **Extrapolation** is predicting outside the range of the data. It is unreliable, because the pattern may not continue.
- Predictions are more reliable when the correlation is strong.

Key terms

Line of best fit	A straight line showing the trend on a scatter diagram.

© LycoLearn · lycolearn.co.uk · Free GCSE and KS3 revision

Mean point	The point $(\bar{x}, \bar{y})$ that a line of best fit should pass through.
Gradient	The change in y for each increase of 1 in x.
Intercept	Where the line crosses the y-axis.
Interpolation	Predicting within the range of the data.
Extrapolation	Predicting outside the range of the data.

Your notes

Quick questions

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

1. Which point should a line of best fit pass through?
2. What is the gradient between (2, 10) and (6, 22)?
3. A line is $y = 12 + 3x$. What is y when $x = 4$?
4. What is interpolation?
5. Why is extrapolation unreliable?
6. In $y = a + bx$, what does b represent?
7. A line is score = 20 + 5 × hours. What does the 5 mean?
8. When should you not draw a line of best fit?

Answers

1. The mean point $(\bar{x}, \bar{y})$
2. 3
3. 24
4. Predicting within the range of the data
5. The pattern may not continue outside the data range
6. The gradient
7. Each extra hour adds about 5 to the score
8. When there is no correlation

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.