MATHEMATICS · GRADES 10-12

Correlation and regression

Difficulty level: Advanced

Mathematics: Grades 10-12

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Overview of the concept

This is how you spot whether two things move together, like study time and test scores. When they do, you can use one to predict the other, like guessing a test score from the hours someone studied. That is how coaches, doctors, and businesses make forecasts from data they already have. It also tells you how strong the link is, so you know how much to trust the prediction.

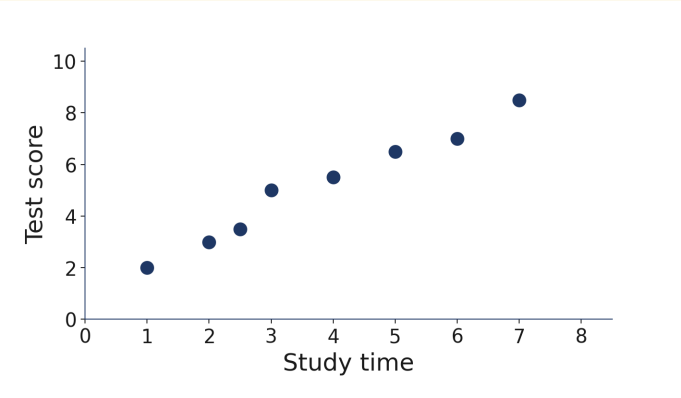


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Worked examples

EXAMPLE 1

Q As study time rises, test scores tend to rise. What kind of correlation is that?



SOLUTION

Both quantities rise together.

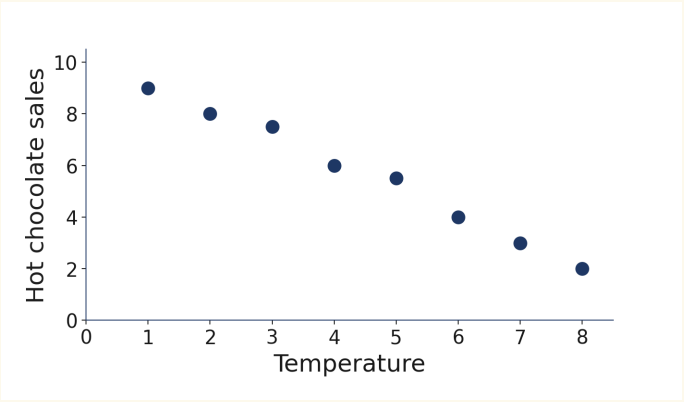
That is a positive correlation.

It does not prove studying causes the scores.

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EXAMPLE 2

Q As temperature rises, hot chocolate sales tend to fall. What kind of correlation is that?



SOLUTION

One rises while the other falls.

That is a negative correlation.

Again, correlation alone does not prove cause.

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Practice questions

1 As the number of books at home rises, reading scores tend to rise. What kind of correlation is that?

- **A** Negative correlation
- **B** Positive correlation
- **C** No correlation
- **D** Strong correlation

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2 As the number of rainy days rises, ice cream sales tend to fall. What kind of correlation is that?

- **A** Negative correlation
- **B** Positive correlation
- **C** No correlation
- **D** Weak correlation

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3 If one quantity rises as the other rises, what kind of correlation is that?

- **A** Negative correlation
- **B** No correlation
- **C** Positive correlation
- **D** Strong correlation

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4 If one rises as the other falls, what kind of correlation is that?

- **A** Positive correlation
- **B** Negative correlation
- **C** No correlation
- **D** Weak correlation

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5 As the number of pets a student owns rises, their test scores stay about the same. What kind of correlation is that?

- **A** Positive correlation
- **B** Negative correlation
- **C** No correlation
- **D** Strong correlation

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6 Study time and test scores have a positive correlation. If a student studies for more hours than usual, what would you expect about their test score?

- **A** It will probably be higher
- **B** It will probably be lower
- **C** It will stay exactly the same
- **D** Nothing can be predicted at all

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7 A scatter plot of two quantities shows the points falling from left to right in a tight line. What kind of correlation is that?

- **A** Positive correlation
- **B** Negative correlation
- **C** No correlation
- **D** Weak correlation

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8 Correlation is scored from 0 to 1, and a score close to 1 means a strong link. If study time and scores have correlation 0.9, is that strong or weak?

- **A** Weak
- **B** Strong
- **C** Positive
- **D** Negative

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Does correlation prove causation?

A Yes

B No

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10

Two quantities have a correlation of 0.1. What does that tell you about the link between them?

A The link is strong

B The link is weak

C One causes the other

D The link is perfect

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ANSWER KEY

1. Positive correlation

2. Negative correlation

3. Positive correlation

4. Negative correlation

5. No correlation

6. It will probably be higher

7. Negative correlation

8. Strong

9. No

10. The link is weak

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