

2.5 Correlation

Name: _____ Class: _____ Date: _____

Total: 9 marks

KEY WORDS correlation coefficient 相关系数 • scatterplot 散点图

Objective

Build the skills to answer exam questions on **correlation**.

You must be able to:

- interpret the **correlation coefficient** 相关系数 r as the strength and direction of a **linear** relationship
- explain that r always lies between -1 and 1
- describe how outliers and non-linear patterns make r **misleading**

1 Worked examples

Study these first. Each one shows the method for a question type used later.

■ The correlation coefficient

r measures the **strength** and **direction** of a **linear** relationship. Always $-1 \leq r \leq 1$:

- near $+1$: strong positive; near -1 : strong negative; near 0 : weak (little linear relationship).

■ Cautions

r only describes **linear** patterns. **Outliers** and **curved** relationships can make r misleading, so always look at the scatterplot too.

2 Practice

2.1 State the range of the correlation coefficient r .

[1]

2.2 State what $r = -0.9$ tells you about the relationship.

[2]

2.3 State one thing that can make r misleading. [1]

3 Exam-style questions

3.1 The correlation coefficient always lies between [1]

- **A** 0 and 1
 - **B** -1 and 1
 - **C** -100 and 100
 - **D** any two values
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3.2 A correlation of $r = 0.05$ indicates a [1]

- **A** strong positive relationship
 - **B** weak (little linear) relationship
 - **C** perfect relationship
 - **D** strong negative relationship
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3.3 A data set has $r = 0.85$.

(a) State the direction of the relationship. [1]

(b) State the strength. [1]

(c) State whether r describes a curved relationship well. [1]

Solutions

2.1 between -1 and 1 .

2.2 a strong negative linear relationship.

2.3 an outlier or a non-linear (curved) pattern (any one).

3.1 B.

3.2 B.

3.3 (a) positive. (b) strong. (c) no — r only measures linear relationships.