

Exercise walk-through

Correlation ■ 2.5

eXercise

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**

Method — 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).

Method — Cautions

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

Practice 2.1 ■ 1 mark

State the range of the correlation coefficient r .

Solution 2.1

Method: The correlation coefficient

Worked steps

between -1 and 1 **B1**.

Practice 2.2 ■ 2 marks

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

Solution 2.2

Worked steps

a strong **B1** negative linear relationship **B1**.

Practice 2.3 ■ 1 mark

State one thing that can make r misleading.

Solution 2.3

Method: Cautions

Worked steps

an outlier or a non-linear (curved) pattern (any one) **B1**.

Exam-style 3.1 ■ 1 mark

The correlation coefficient always lies between

- A** 0 and 1
- B** -1 and 1
- C** -100 and 100
- D** any two values

Solution 3.1

Method: The correlation coefficient

A 0 and 1

B -1 and 1



C -100 and 100

D any two values

Worked steps

B.

Exam-style 3.2 ■ 1 mark

A correlation of $r = 0.05$ indicates a

- A** strong positive relationship
- B** weak (little linear) relationship
- C** perfect relationship
- D** strong negative relationship

Solution 3.2

- A strong positive relationship
- B weak (little linear) relationship**
- C perfect relationship
- D strong negative relationship



Worked steps

B.

Exam-style 3.3 ■ 1 mark

A data set has $r = 0.85$.

- (a) State the direction of the relationship.
- (b) State the strength.
- (c) State whether r describes a curved relationship well.

Solution 3.3

Method: The correlation coefficient

Worked steps

(a) positive **B1**. (b) strong **B1**. (c) no — r only measures linear relationships **B1**.