

Exercise walk-through

Introducing Statistics: Do Those Points Align? ■ 9.1

eXercise

You must be able to

- explain that inference for the slope tests whether a **linear relationship** exists
- state that a slope of 0 means **no linear relationship**
- identify the sample slope b as an estimate of the population slope β

Method — The question

Inference for regression asks whether the **true (population) slope** β is different from 0 — i.e. whether there is a real **linear relationship** between x and y .

Method — Slope of zero

If $\beta = 0$, changes in x predict **no** change in y — no linear relationship. The **sample slope** b (from the least-squares line) is our estimate of β .

Practice 2.1 ■ 1 mark

State what inference for the slope tests.

Solution 2.1

Method: The question

Worked steps

whether there is a linear relationship (whether the true slope $\beta \neq 0$) **B1**.

Practice 2.2 ■ 1 mark

State what a slope of 0 means for the relationship.

Solution 2.2

Worked steps

no linear relationship between x and y **B1**.

Practice 2.3 ■ 1 mark

State the parameter estimated by the sample slope b .

Solution 2.3

Method: Slope of zero

Worked steps

the population slope β **B1**.

Exam-style 3.1 ■ 1 mark

Inference for regression tests whether the true slope is

A 1

B 0 (no linear relationship)

C the mean

D negative

Solution 3.1

Method: The question

A 1

B 0 (no linear relationship)



C the mean

D negative

Worked steps

B.

Exam-style 3.2 ■ 1 mark

The sample slope b estimates the

- A** intercept
- B** population slope β
- C** correlation
- D** residual

Solution 3.2

Method: Slope of zero

A intercept

B population slope β



C correlation

D residual

Worked steps

B.

Exam-style 3.3 ■ 1 mark

A regression of weight on height is analysed.

- (a) Name the parameter of interest.
- (b) State what a slope of 0 would mean.
- (c) Name the value that estimates it.

Solution 3.3

Method: The question

Worked steps

(a) the population slope β **B1**. (b) no linear relationship between height and weight **B1**. (c) the sample slope b **B1**.