

9.3 Justifying a Claim About the Slope of a Regression Model Based on a Confidence Interval

Name: _____ Class: _____ Date: _____ Total: 8 marks

KEY WORDS linear 线性 • regression 回归

Objective

Build the skills to answer exam questions on **justifying a claim about the slope from a confidence interval**.

You must be able to:

- use a CI for the slope to judge whether a **linear relationship** exists
- recognise that an interval containing 0 means **no significant linear relationship**

1 Worked examples

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

■ Using the slope interval

The confidence interval gives the plausible values of the true slope β :

- if it **contains** 0, there is **no significant linear relationship** (β could be 0);
- if it is entirely **positive** or **negative**, there **is** a significant linear relationship.

■ Reading a worked interval

Regression output gives the slope's 95% interval as (0.4, 1.6). It is entirely **positive** and excludes 0, so there **is** a significant positive linear relationship. An interval of (−0.3, 1.1) would contain 0 – no significant linear relationship.

2 Practice

2.1 State how a CI for the slope judges “no linear relationship”. [1]

2.2 A 95% CI for the slope is (0.5, 1.5). State whether there is evidence of a linear relationship. [1]

2.3 State what a slope interval containing 0 implies. [1]

3 Exam-style questions

3.1 If a confidence interval for the slope contains 0, there is [1]

- | | |
|---|---|
| A | B |
| C | D |
- A a strong relationship
 - B no significant linear relationship
 - C an error
 - D a curved pattern

3.2 A 95% CI for the slope is (1.2, 2.8). This suggests [1]

- | | |
|---|---|
| A | B |
| C | D |
- A no relationship
 - B a positive linear relationship
 - C a negative linear relationship
 - D a curve

3.3 A 95% CI for the slope is (−0.2, 0.6).

- (a) State whether 0 is in the interval. [1]
- (b) State whether there is a significant linear relationship. [1]
- (c) State the plausible conclusion. [1]