

7.7 Justifying a Claim About the Difference of Two Means Based on a Confidence Interval

Name: _____ Class: _____ Date: _____

Total: 8 marks

Objective

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

You must be able to:

- use a CI for $\mu_1 - \mu_2$ to judge a claim of no difference
- recognise an interval containing 0 as "no significant difference"

1 Worked examples

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

■ Judging a difference

A confidence interval for $\mu_1 - \mu_2$ gives the plausible differences:

- if it **contains** 0, "no difference" ($\mu_1 = \mu_2$) is plausible;
- if it is entirely positive or negative, there is a significant difference.

■ Reading a worked interval

A 95% interval for $\mu_1 - \mu_2$ comes out as (1.2, 5.4). It is entirely **positive** and excludes 0, so group 1's mean is significantly higher. An interval of (−1.1, 3.0) would contain 0 – no significant difference.

2 Practice

2.1 State how a CI for $\mu_1 - \mu_2$ judges "no difference". [1]

2.2 A 95% CI for $\mu_1 - \mu_2$ is (−1, 3). State whether "no difference" is plausible. [1]

2.3 State what a fully positive interval implies. [1]

3 Exam-style questions

3.1 "No difference" ($\mu_1 = \mu_2$) is plausible if the CI for $\mu_1 - \mu_2$ contains [1]

- | | |
|---|---|
| A | B |
| C | D |
- A** 1
B 0
C $\bar{x}_1$
D the mean

3.2 A 95% CI for $\mu_1 - \mu_2$ is $(2, 6)$. The claim $\mu_1 = \mu_2$ is [1]

- | | |
|---|---|
| A | B |
| C | D |
- A** supported
B not supported
C certainly true
D unknown

3.3 A 95% CI for the difference in mean scores is $(-2, 5)$.

- (a) State whether 0 is in the interval. [1]
(b) State whether the means differ significantly. [1]
(c) State the plausible conclusion. [1]