

Exercise walk-through

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

eXercise

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”

Method — 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.

Method — 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.

Practice 2.1 ■ 1 mark

State how a CI for $\mu_1 - \mu_2$ judges “no difference”.

Solution 2.1

Worked steps

if the interval contains 0, “no difference” is plausible **B1**.

Practice 2.2 ■ 1 mark

A 95% CI for $\mu_1 - \mu_2$ is $(-1, 3)$. State whether “no difference” is plausible.

Solution 2.2

Method: Judging a difference

Worked steps

yes, plausible (0 is inside) **B1**.

Practice 2.3 ■ 1 mark

State what a fully positive interval implies.

Solution 2.3

Worked steps

that $\mu_1 > \mu_2$ (a real difference) **B1**.

Exam-style 3.1 ■ 1 mark

“No difference” ($\mu_1 = \mu_2$) is plausible if the CI for $\mu_1 - \mu_2$ contains

A 1

B 0

C $\bar{x}_1$

D the mean

Solution 3.1

Method: Judging a difference

A 1

B 0



C $\bar{x}_1$

D the mean

Worked steps

B.

Exam-style 3.2 ■ 1 mark

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

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

Solution 3.2

A supported

B not supported 

C certainly true

D unknown

Worked steps

B.

Exam-style 3.3 ■ 1 mark

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

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

Solution 3.3

Method: Reading a worked interval

Worked steps

(a) yes **B1**. (b) no **B1**. (c) there is no significant difference between the means **B1**.