

Exercise walk-through

Confidence Intervals for the Difference of Two Means ■ 7.6

eXercise

You must be able to

- use the point estimate $\bar{x}_1 - \bar{x}_2$
- build the interval $(\bar{x}_1 - \bar{x}_2) \pm t^* \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$
- use the interval to judge whether the two means differ

Method — The two-mean interval

$$(\bar{x}_1 - \bar{x}_2) \pm t^* \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}.$$

Method — Judging a difference

If the interval **contains** 0, the two means may not differ. If it is entirely **positive** ($\mu_1 > \mu_2$) or **negative** ($\mu_1 < \mu_2$), there is a significant difference.

Practice 2.1 ■ 1 mark

Write the point estimate for the difference of two means.

Solution 2.1

Method: Judging a difference

Worked steps

$$\bar{x}_1 - \bar{x}_2 \quad \text{B1}.$$

Practice 2.2 ■ 1 mark

State how to judge whether the means differ using the interval.

Solution 2.2

Method: Judging a difference

Worked steps

if the interval contains 0, there is no significant difference; if not, there is **B1**.

Practice 2.3 ■ 1 mark

For $\bar{x}_1 = 52$ and $\bar{x}_2 = 48$, find the point estimate of the difference.

Solution 2.3

Worked steps

$$52 - 48 = 4 \text{ (B1).}$$

Exam-style 3.1 ■ 1 mark

A confidence interval for $\mu_1 - \mu_2$ is centred on

A $\bar{x}_1 \cdot \bar{x}_2$

B $\bar{x}_1 - \bar{x}_2$

C 0

D $\bar{x}_1 + \bar{x}_2$

Solution 3.1

A $\bar{x}_1 \cdot \bar{x}_2$

B $\bar{x}_1 - \bar{x}_2$ 

C 0

D $\bar{x}_1 + \bar{x}_2$

Worked steps

B.

Exam-style 3.2 ■ 1 mark

If a 95% CI for $\mu_1 - \mu_2$ contains 0, the two means

A definitely differ

B may not differ

C are exactly equal

D are both zero

Solution 3.2

Method: Judging a difference

A definitely differ

B may not differ 

C are exactly equal

D are both zero

Worked steps

B.

Exam-style 3.3 ■ 1 mark

A 95% CI for $\mu_1 - \mu_2$ is (1.5, 4.5).

- (a) State which mean is larger.
- (b) State whether 0 is in the interval.
- (c) State whether there is a significant difference.

Solution 3.3

Method: Judging a difference

Worked steps

(a) μ_1 (the interval is positive) **B1**. (b) no **B1**. (c) yes **B1**.