

Exercise walk-through

7.6

Confidence Intervals for the Difference of Two Means

AP Statistics

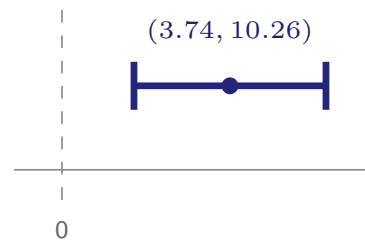
Difference of two means

The design decides the tool:

- **independent samples** $\Rightarrow$
two-sample t-interval t
- **paired** data $\Rightarrow$ one-sample t on
 the differences

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

Variances **add** under the root. If the interval excludes 0, the means differ.



Excludes 0 $\Rightarrow$ Brand
1 longer.

Exercises 2.1·2.3

2.1 Write the point estimate for the difference of two means. [1]

2.2 State how to judge whether the means differ using the interval. [1]

2.3 For $\bar{x}_1 = 52$ and $\bar{x}_2 = 48$, find the point estimate of the difference. [1]

Exercises 2.1·2.3

2.1 Write the point estimate for the difference of two means. [1]

2.1

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

2.2 State how to judge whether the means differ using the interval. [1]

2.2

- if the interval contains 0, there is no significant difference; if not, there is
-

2.3 For $\bar{x}_1 = 52$ and $\bar{x}_2 = 48$, find the point estimate of the difference. [1]

2.3

- $52 - 48 = 4$

Exercises 3.1-3.2

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

[1]

☐

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

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

C 0

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

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

[1]

☐

A definitely differ

B may not differ

C are exactly equal

D are both zero

Exercises 3.1-3.2

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

[1]

☐

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

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

C 0

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

3.1 B

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

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

[1]

☐

A definitely differ

B may not differ

C are exactly equal

D are both zero

3.2 B

- may not differ.

Exercise 3.3 (a)

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

(a) State which mean is larger.

[1]

Exercise 3.3 (a)

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

(a) State which mean is larger.

[1]

(a)

- μ_1 (the interval is positive)

Exercise 3.3 (b)

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

(b) State whether 0 is in the interval.

[1]

Exercise 3.3 (b)

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

(b) State whether 0 is in the interval.

[1]

(b)

- no

Exercise 3.3 (c)

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

(c) State whether there is a significant difference.

[1]

Exercise 3.3 (c)

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

(c) State whether there is a significant difference.

[1]

(c)

- yes