

Exercise walk-through

7.4

Setting Up a Test for a Population Mean

AP Statistics

Two-mean test and paired data

A **two-sample t-test** t of
 $H_0 : \mu_1 = \mu_2$ - **do not pool** (unlike
 proportions):

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{s_1^2/n_1 + s_2^2/n_2}}$$

Same subjects measured twice? Use a
paired t-test t : reduce each
 pair to a difference d , then a one-sample
 t .

Brands

$\bar{x}_1 = 85, \bar{x}_2 = 78; SE = \sqrt{2}$:

$$t = \frac{7}{1.414} \approx 4.95$$

$df = 8, p \approx 0.001$: reject.

Exercises 2.1-2.3

2.1 State the null hypothesis for a test about a mean.

[1]

2.2 Write the test-statistic formula for a mean.

[1]

2.3 $\bar{x} = 52$, $\mu_0 = 50$, $s = 8$, $n = 16$. Find the test statistic t .

[2]

Exercises 2.1-2.3

2.1 State the null hypothesis for a test about a mean.

[1]

2.1

- $H_0 : \mu = \mu_0$

2.2 Write the test-statistic formula for a mean.

[1]

2.2

- $t = \frac{\bar{x} - \mu_0}{s/\sqrt{n}}$

2.3 $\bar{x} = 52$, $\mu_0 = 50$, $s = 8$, $n = 16$. Find the test statistic t .

[2]

2.3

- $t = \frac{52 - 50}{8/\sqrt{16}} = \frac{2}{2} = 1.0$

Exercise 3.1

3.1 The test statistic for a mean is

[1]

☐

A $\frac{\bar{x} - \mu_0}{s/\sqrt{n}}$

B $\frac{\hat{p} - p_0}{\text{SE}}$

C $\bar{x} \cdot s$

D $\frac{\mu_0}{n}$

Exercise 3.1

3.1 The test statistic for a mean is

[1]

☐

A $\frac{\bar{x} - \mu_0}{s/\sqrt{n}}$

B $\frac{\hat{p} - p_0}{\text{SE}}$

C $\bar{x} \cdot s$

D $\frac{\mu_0}{n}$

3.1 A

• $\frac{\bar{x} - \mu_0}{s/\sqrt{n}}.$

Exercise 3.2

3.2 The degrees of freedom for a one-sample mean test are

[1]

☐

A n

B $n - 1$

C $n + 1$

D 0

Exercise 3.2

3.2 The degrees of freedom for a one-sample mean test are

[1]

☐

A n

B $n - 1$

C $n + 1$

D 0

3.2 B

- $n - 1$.

Exercise 3.3 (a)

3.3 A test of $\mu \neq 100$ has $\bar{x} = 104$, $s = 10$, $n = 25$.

(a) Write H_0 .

[1]

Exercise 3.3 (a)

3.3 A test of $\mu \neq 100$ has $\bar{x} = 104$, $s = 10$, $n = 25$.

(a) Write H_0 .

[1]

(a)

- $H_0 : \mu = 100$

Exercise 3.3 (b)

3.3 A test of $\mu \neq 100$ has $\bar{x} = 104$, $s = 10$, $n = 25$.

(b) Compute t .

[2]

Exercise 3.3 (b)

3.3 A test of $\mu \neq 100$ has $\bar{x} = 104$, $s = 10$, $n = 25$.

(b) Compute t .

[2]

(b)

- $$t = \frac{104 - 100}{10/\sqrt{25}} = \frac{4}{2} = 2.0$$

Exercise 3.3 (c)

3.3 A test of $\mu \neq 100$ has $\bar{x} = 104$, $s = 10$, $n = 25$.

(c) State the degrees of freedom.

[1]

Exercise 3.3 (c)

3.3 A test of $\mu \neq 100$ has $\bar{x} = 104$, $s = 10$, $n = 25$.

(c) State the degrees of freedom.

[1]

(c)

- 24