

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Assume that a hypothesis test of the given claim will be conducted. Identify the type I or type II error for the test.

1) A medical researcher claims that 3% of children suffer from a certain disorder. Identify the type I error for the test. 1) A
claim is $H_0 = p = 0.03$

*Use table
8-1 on
p 393.*

- A) Reject the claim that the percentage of children who suffer from the disorder is equal to 3% when that percentage is actually 3%.
- B) Fail to reject the claim that the percentage of children who suffer from the disorder is equal to 3% when that percentage is actually 3%.
- C) Reject the claim that the percentage of children who suffer from the disorder is different from 3% when that percentage really is different from 3%.

claim is 2) The principal of a school claims that the percentage of students at his school that come from single-parent homes is 10%. Identify the type II error for the test. 2) A
 $H_0 =$

$p = 0.10$

- A) Fail to reject the claim that the percentage of students that come from single-parent homes is equal to 10% when that percentage is actually different from 10%.
- B) Reject the claim that the percentage of students that come from single-parent homes is equal to 10% when that percentage is actually less than 10%.
- C) Fail to reject the claim that the percentage of students that come from single-parent homes is equal to 10% when that percentage is actually 10%.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Identify the null hypothesis, alternative hypothesis, test statistic, P-value, conclusion about the null hypothesis, and final conclusion that addresses the original claim.

3) A random sample of 100 pumpkins is obtained and the mean circumference is found to be 40.5 cm. Assuming that the population standard deviation is known to be 1.6 cm, use a 0.05 significance level to test the claim that the mean circumference of all pumpkins is equal to 39.9 cm. 3) _____

Test the given claim. Use the P-value method or the traditional method as indicated. Identify the null hypothesis, alternative hypothesis, test statistic, critical value(s) or P-value, conclusion about the null hypothesis, and final conclusion that addresses the original claim.

4) The mean resting pulse rate for men is 72 beats per minute. A simple random sample of men who regularly work out at Mitch's Gym is obtained and their resting pulse rates (in beats per minute) are listed below. Use a 0.05 significance level to test the claim that these sample pulse rates come from a population with a mean less than 72 beats per minute. Assume that the standard deviation of the resting pulse rates of all men who work out at Mitch's Gym is known to be 6.6 beats per minute. Use the traditional method of testing hypotheses. 4) _____

- 54 61 69 84 74 64 69
- 70 66 80 59 71 76 63

3) $n = 100$ pumpkins

$\bar{x} = 40.5$ cm

$\sigma = 1.6$ cm

$\alpha = 0.05$

claim The mean circumference of all pumpkins is 39.9 cm.

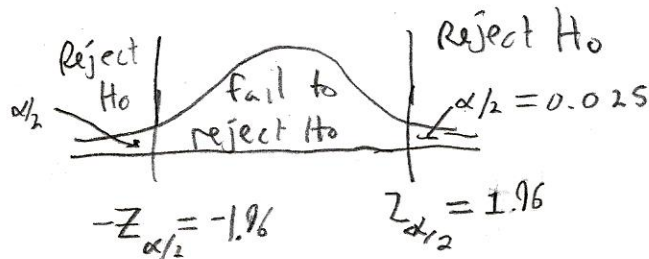
Symbolic form: $\mu = 39.9$

Step 1 $H_0: \mu = 39.9$ (claim)

Step 2 $H_1: \mu \neq 39.9$

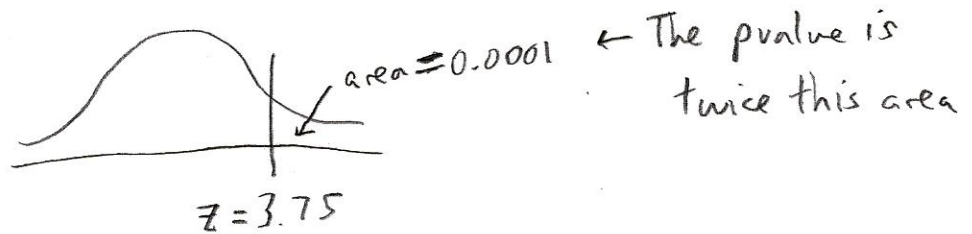
Step 3 the test statistic is $z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{40.5 - 39.9}{1.6/\sqrt{100}} = \frac{0.6}{0.16} = 3.75$

Step 4: CV method



The test stat lies in the rejection region, so we reject H_0 .

Step 4 P-value method



Since the $p\text{-val} \leq \alpha$, reject H_0 .

Step 5 = There is sufficient evidence to warrant rejection of the claim that the mean circumference of all pumpkins is 39.9 cm.

$$(4) \quad \mu = 72 \text{ bpm}$$

$$n = 14$$

$$\bar{x} \approx 68.6 \quad (\text{found with given sample data})$$

$$\sigma = 6.6$$

$$\alpha = 0.05$$

Claim: the mean resting pulse rate for men is less than 72 bpm.

symbolic form $\mu < 72$

Step 1 $H_0: \mu \geq 72 \text{ bpm}$

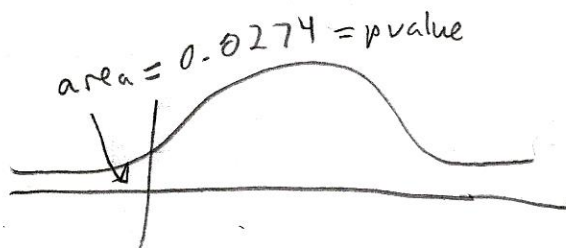
Step 2 $H_1: \mu < 72 \text{ bpm}$ (claim)

Step 3 The test statistic is $Z = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}} = \frac{68.6 - 72}{6.6/\sqrt{14}} = \frac{-3.4}{1.7639} = -1.92$



Since the test stat., $Z = -1.92$ is less than the CV, we reject H_0

Step 4 Pvalue method



$$Z = -1.92 \quad (\text{test stat})$$

Since the $p\text{-val} \leq \alpha$, reject H_0 .

Step 5 The sample data support the claim that the mean resting ^{Pulse} rate for men is less than 72 bpm.