

Week 9 - Quiz

Problem 1

If my null hypothesis is *"Dutch people do not differ from English people in height"*, what is my alternative hypothesis?

- A. All of the statements are plausible alternative hypotheses.
- B. Dutch people are taller than English people.
- C. English people are taller than Dutch people.
- D. Dutch people differ in height from English people.

Correct Answer: D

"Do not differ" \Rightarrow " $=$ " ; $H_0 =$ vs $H_a : \neq$
Therefore D is correct.

Problem 2

If my experimental hypothesis were *"Eating cheese before bed affects the number of nightmares you have"*, what would the null hypothesis (H_0) be?

- A. Eating cheese before bed gives you more nightmares.
- B. Eating cheese before bed gives you fewer nightmares.
- C. Eating cheese is linearly related to the number of nightmares you have.
- D. The number of nightmares you have is not affected by eating cheese before bed.

Correct Answer: D

"affects" \Rightarrow " \neq " therefore : $H_0 =$ "Do not affect"
 $H_a : \neq$ "affect"

Problem 3

In hypothesis testing, the hypothesis which is tentatively assumed to be true is called the

- A. correct hypothesis
- B. null hypothesis
- C. alternative hypothesis
- D. level of significance

Correct Answer: B

By the logic of testing hypothesis.

Problem 4

A researcher claims that 62% of voters favor gun control. Determine the null and alternative hypotheses.

- A $H_0: p \neq 0.62$ vs. $H_a: p = 0.62$
- B $H_0: p \geq 0.62$ vs. $H_a: p < 0.62$
- C $H_0: p < 0.62$ vs. $H_a: p \geq 0.62$
- D $H_0: p \geq 0.62$ vs. $H_a: p < 0.62$
- E $H_0: p = 0.62$ vs. $H_a: p \neq 0.62$

Correct Answer: E

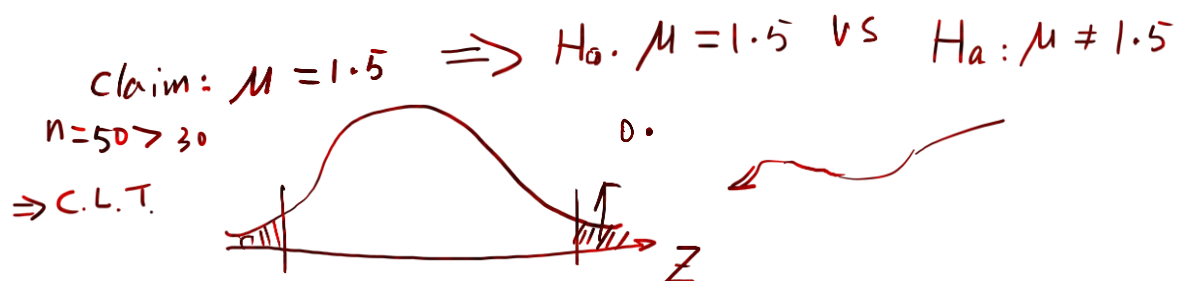
claim: $p = 0.62$. does ~~not~~ have an equal sign,
 $H_0: p = 0.62$ vs. $H_a: p \neq 0.62$

Problem 5

Nestor Milk Powder is sold in packets with an advertised mean weight of 1.5kgs. The standard deviation is known to be 184 grams. A consumer group wishes to check the accuracy of the advertised mean and takes a sample of 52 packets finding an average weight of 1.49kgs. What is the set of hypotheses that should be used to test the accuracy of advertised weight?

- A $H_0: \mu = 1.5$ vs $H_a: \mu \neq 1.5$
- B $H_0: \mu = 1.5$ vs $H_a: \mu < 1.5$
- C $H_0: x = 1.49$ vs $H_a: x \neq 1.49$
- D $H_0: x = 1.5$ vs $H_a: x < 1.5$

Correct Answer: A



Problem 6

Mr. Rumpole *believes that* the mean income of lawyers is now *more than* \$65000 thousand per year. Which is the correct set of hypotheses to test this belief?

- A $H_0: \mu \geq 65000$ vs $H_a: \mu < 65000$
- B $H_0: \mu \leq 65000$ vs $H_a: \mu > 65000$
- C $H_0: \mu = 65000$ vs $H_a: \mu \neq 65000$
- D $H_0: \mu < 65000$ vs $H_a: \mu \geq 65000$

Correct Answer: B

Claim: $\mu > 65000 \Rightarrow H_0: \mu \leq 65000$ vs $H_a: \mu > 65000$

**Problem 7**

Suppose a businessperson wishes to open a store in a local shopping center only if there is strong evidence that the average number of people in the center is *greater than* 5000 per day. The null hypothesis will be

- A $H_0: \mu \leq 5000$
- B $H_0: \mu > 5000$
- C $H_0: \mu \geq 5000$
- D $H_0: \mu < 5000$

Correct Answer: A

Claim: $\mu > 5000$
 $\Rightarrow H_0: \mu \leq 5000$

Problem 8

A manufacturer of chocolate toppings uses machines to dispense liquid ingredients into bottles that move along a filling line. The machine that dispenses toppings is working properly when 8 grams are dispensed. The standard deviation of the process is 0.15 grams. A sample of 50 bottles is selected periodically and the filling line is stopped *if there is evidence that the average amount dispensed is less than 8 grams*. Suppose that the average amount dispensed in a sample of 50 bottles is 7.983 grams. What is the null hypothesis (H_0)?

- A. $\mu < 8$
- B. $\mu \geq 8$
- C. $\mu > 8$
- D. $\mu \leq 8$
- E. $\mu = 8$

Correct Answer: B

claim: $\mu < 8$

$\Rightarrow H_0: \mu \geq 8$ vs $H_a: \mu < 8$

Problem 9

The standard deviation of a large population is 20. To test

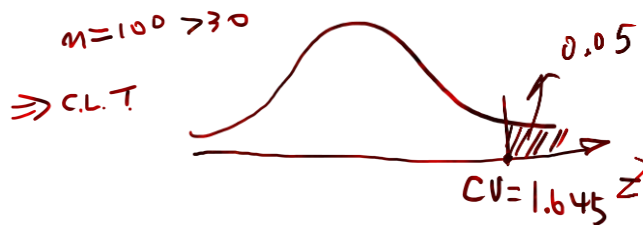
$$H_0: \mu \leq 4 \text{ vs. } H_a: \mu > 4$$

at a level of significance of .05, a sample of size 100 will be taken.

You will reject H_0 if the test statistic

- A. $TS \geq 1.96$
- B. $TS \geq 0.95$ or $TS \leq -1.96$
- C. $TS \geq 1.645$
- D. $TS \geq 1.645$ or $TS \leq -1.645$
- E. $TS > 1.285$

Correct Answer: C



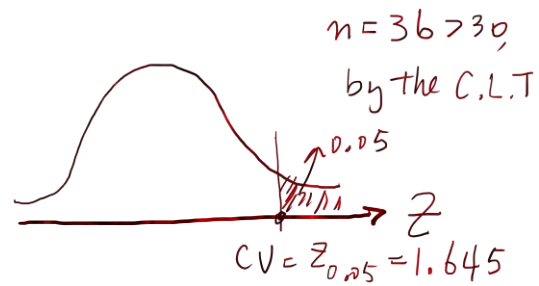
Problem 10

We are interested in conducting a test with the following hypothesis $H_0: \mu = 20$ vs. $H_a: \mu > 20$. If the sample size is 36, $s = 12$, the *population is normal*, and the level of significance is 0.05, what is the rejection region for this test? Reject H_0 if

- A. $TS < 1.753$
- B. $TS > 2.575$
- C. $TS > 1.96$
- D. $TS > 1.645$

Correct Answer: D

$$H_a: \mu > 20$$



Problem 11.

The null hypothesis is rejected if

- A. The null hypothesis is true.
- B. The alternative hypothesis is true.
- C. The p-value is less or equal to the significance level.
- D. The p-value is larger than the significance level.

Answer: C.

Problem 12.

For a two-tailed normal test, the p-value is defined to be

- A). The area to the right of the test statistic of the normal density curve.
- B). The area to the left of the test statistic of the normal density curve.
- C). The area between the two critical values in the normal density curve.
- D). Two times of the smaller tail area.

Answer D.

Problem 13.

Given $H_0: \mu = 25$, $H_a: \mu \neq 25$, and P-value = 0.041. Do you reject or fail to reject H_0 at the 0.01 level of significance?

- A) fail to reject H_0
- B) not sufficient information to decide
- C) reject H_0

Answer: A.

Problem 14.

The area **to the left** of the test statistic is 0.375. What is P- the value if this is a **right tail test**?

- A) 0.625
- B) 0.1885
- C) 0.750
- D) 0.375

Answer: A. $1 - 0.375 = 0.625$

Problem 15

The area to the left of the test statistic is 0.375. What is the P- value if this is a two-tail test?

- A) 0.625
- B) 0.750
- C) 0.375
- D) 0.1885

Answer: B. Double the smaller tail area.

Summary of Weekly Quiz #9

The five-number summary of this given data set is:

stats	value
Min.	65.00
1st Qu.	90.00
Median	90.00
3rd Qu.	90.00
Max.	100.00

2. Boxplot :

The boxplot is a geometric representation of the five-number summary. The boxplot of the given data set is given below.

