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" ⇒ "=" : H_0 = vs H_a : ≠
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 (Ho) 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" ⇒ "≠" therefore : H_0 = "Do not affect"
H_a : ≠ "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 Ho: $p \neq 0.62$ vs. Ha: $p = 0.62$
B Ho: $p \geq 0.62$ vs. Ha: $p < 0.62$
C Ho: $p < 0.62$ vs. Ha: $p \geq 0.62$
D Ho: $p \geq 0.62$ vs. Ha: $p < 0.62$
E Ho: $p = 0.62$ vs. Ha: $p \neq 0.62$

Correct Answer: E

claim: $p = 0.62$. does have an equal sign,

$H_0: p = 0.62$ v.s. $Ha: p \neq .62$

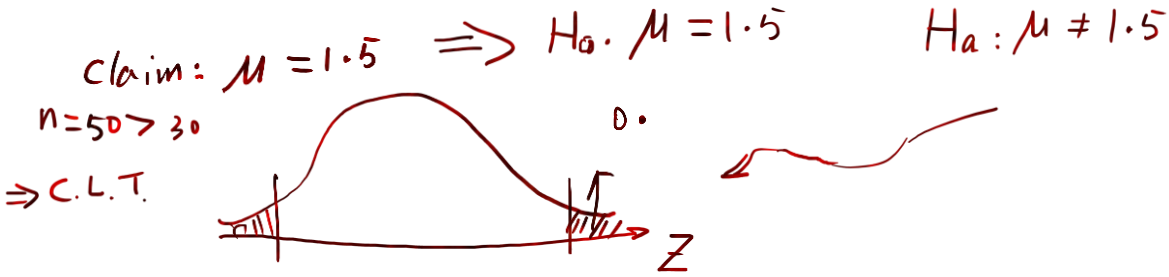
Problem 5

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 Ho: $\mu = 1.5$ vs Ha: $\mu \neq 1.5$
B Ho: $\mu = 1.5$ vs Ha: $\mu < 1.5$
C Ho: $x = 1.49$ vs Ha: $x \neq 1.49$
D Ho: $x = 1.5$ vs Ha: $x < 1.5$

Correct Answer: A

vs

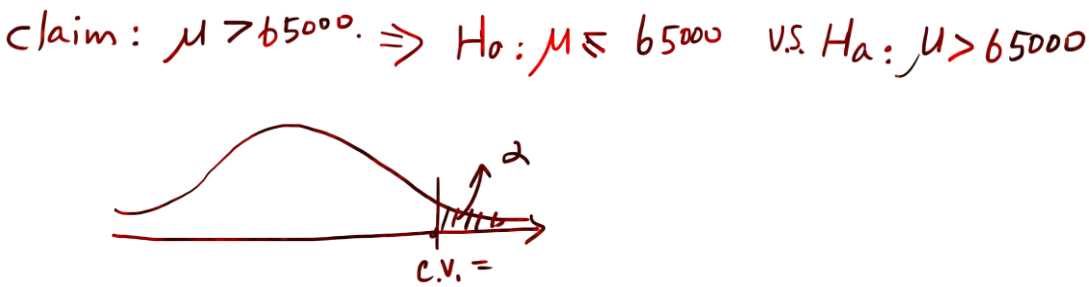


Problem 6

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 Ho: μ ≥ 65000 vs Ha: μ < 65000
B Ho: μ ≤ 65000 vs Ha: μ > 65000
C Ho: μ = 65000 vs Ha: μ ≠ 65000
D Ho: μ < 65000 vs Ha: μ ≥ 65000

Correct Answer: B



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 H0: μ ≤ 5000
B H0: μ > 5000
C H0: μ ≥ 5000
D H0: μ < 5000

Correct Answer: A

$\Rightarrow \quad H_0: \mu \leq 5000$

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 (Ho)?

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

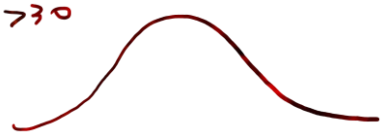
$H_o: \mu \leq 4$ vs. $H_a: \mu > 4$

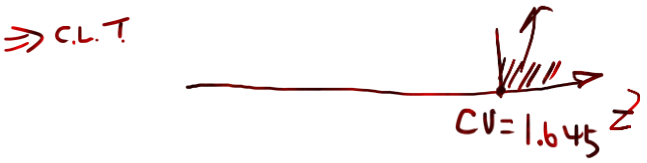
at a level of significance of .05, a sample of size 100 will be taken.
You will reject H_O if the test statistic

A. TS ≥ 1.96
B. TS ≥ 0.95 or TS ≤ -1.96
C. TS ≥ 1.645
D. TS ≥ 1.645 or TS ≤ -1.645
E. TS > 1.285

Correct Answer: C

$n=100 > 30$



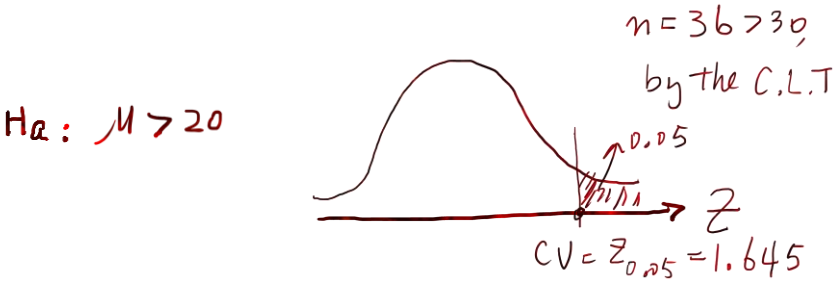


Problem 10

We are interested in conducting a test with the following hypothesis Ho: μ = 20 vs. Ha: μ > 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



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 H0: $\mu = 25$, Ha: $\mu \neq 25$, and P-value = 0.041. Do you reject or fail to reject H0 at the 0.01 level of significance?

A) fail to reject Ho
B) not sufficient information to decide
C) reject Ho

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

1. Five Number Summary :

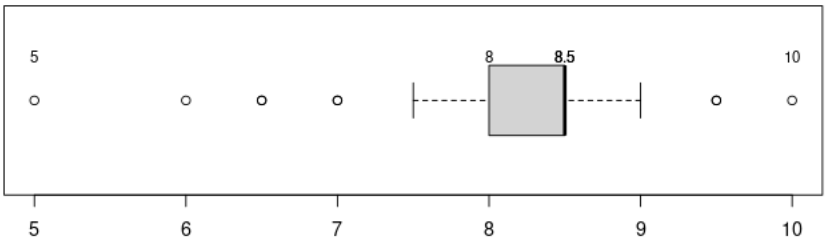
The five-number summary is use used to describe the shape of the distribution of a given numerical data. It consists of five numbers: minimum data value, first quartile, median, the third quartile, and the maximum data value.

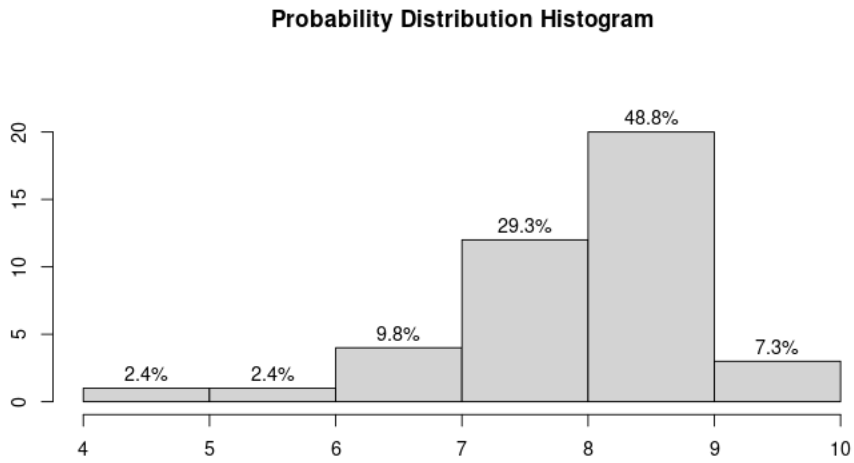
The five-number summary of this given data set is:

stats	value
Min.	5.00
1st Qu.	8.00
Median	8.50
3rd Qu.	8.50
Max.	10.00

2. Boxplot :

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





The class boundary is: 4.9,5.9,6.9,7.9,8.9,10

cut.data.freq	Freq	midpts	rel.freq	cum.freq	rel.cum.freq
[4.9,5.9]	1	5.40	0.02	1	0.02
(5.9,6.9]	3	6.40	0.07	4	0.10
(6.9,7.9]	5	7.40	0.12	9	0.22
(7.9,8.9]	24	8.40	0.58	33	0.81
(8.9,10]	8	9.45	0.20	41	1.00