Stats 300 **Spring 2024**

Lab Assignment #18

This lab is due at 9:35 AM on Wednesday, 4/10 and is worth 6 points. This may be done individually, or in a group of 2 or 3 people.

1) A hardware store in West Covina, CA, conducts a survey to estimate the average number of houseplants in people's houses. A sample of 40 people gives the following data:

13, 5, 18, 20, 0, 1, 3, 0, 3, 1,
23, 16, 0, 0, 19, 10, 24, 20, 3, 2,
7, 24, 0, 6, 1, 11, 2, 2, 16, 1,
3, 2, 14, 1, 10, 5, 2, 6, 1, 8

Claim: The average number of houseplants for all West Covina households is less than 10.5. Test this claim at the 5% significance level ($\alpha = 0.05$).

a) Write the null and alternative hypotheses.
b) Calculate the test statistic. (It's t.)
c) Bound this value of t between the two nearest values in the t-table.
d) Find bounds on the tail area, and thus, on the p-value.
(The p-value equals the tail area for this problem.)
e) State your conclusion. Either...
$p < \alpha$, reject H_0, accept H_a
OR
$p > \alpha$, fail to reject H_0, fail to accept H_a
f) Write a 1-sentence summary.
g) Check your answer for t and p on your GC, if you have a GC.

2) Test the claim that the average number of cars owned by all residents in North Verdes is greater than 2.8. Use the sample data of 93 residents and a 0.5% significance level ($\alpha = 0.005$).

# of cars	Frequency
0	3
1	10
2	18
3	27
4	19
5	12
6	4

a) Write the null and alternative hypotheses.
b) Calculate the test statistic. (It's t.)
c) Bound this value of t between the two nearest values in the t-table. Note: the number of degrees of freedom is not in the t-table, so use the nearest available number.
d) Find bounds on the tail area, and thus, on the p-value. (The p-value equals the tail area for this problem.)
e) State your conclusion. Either...

$p < \alpha$, reject H_0, accept H_a

OR

$p > \alpha$, fail to reject H_0, fail to accept H_a

f) Write a 1-sentence summary.
g) Check your answer t and p on your GC, if you have a GC.

3) The null and alternative hypotheses for a hypothesis test are...
H_0: $\mu = 4.76$
H_1: $\mu > 4.76$
The significance level, α, equals 2.5%. The sample size is 30.

a) What is the "critical" value of t, that is, what is the boundary between rejecting H_0 and failing to reject H_0?

b) Suppose that the sample standard deviation equals 1.89. What is the minimum value of the sample mean for which one would reject H_0?

4) a) Did you accept the null hypothesis for either problem 1 or problem 2?

b) Do you plan on accepting the null hypothesis for any upcoming problems here in Stat 300?

c) Why or why not?