**LEARN BY DOING:** Hypothesis Testing for the Population Mean

The purpose of this activity is to give you guided practice in the process of a *t*-test for the population mean.

**Background:**

A group of 75 college students from a certain liberal arts college were randomly sampled and asked about the number of alcoholic drinks they have in a typical week. The file containing the data is linked below. The purpose of this study was to compare the drinking habits of the students at the college to the drinking habits of college students in general.

In particular, the dean of students, who initiated this study, would like to **check whether the mean number of alcoholic drinks that students at his college have in a typical week differs from the mean of U.S. college students in general, which is estimated to be 4.73.**

**Let μ be the mean number of alcoholic beverages that students in THIS college drink in a typical week.**

Answer the following questions using this SPSS OUTPUT (PDF), SAS OUTPUT (PDF), this SAS CODE

The raw data are also provided if you are interested in looking at it yourself: EXCEL or CSV

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**QUESTION 1:**

State the hypotheses that are being tested in this problem.

CHECK ANSWER

**QUESTION 2:**

a. Look at the data using a histogram and describe the shape of the distribution.

b. Why are the conditions allowing us to safely use the *t*-test are met regardless of your findings in (a)?

CHECK ANSWER

**QUESTION 3:**

State the test statistic, interpret its value and show how it was found.

CHECK ANSWER

**QUESTION 4:**

Based on the p-value, draw your conclusions in context.

CHECK ANSWER

**QUESTION 5:**

What would your conclusions be if the dean of students suspected that the mean number of alcoholic drinks that students in the college consume in a typical week is lower than the mean of U.S. college students in general? In other words, if this were a test of the hypotheses:

H0: $\mu = 4.73$ drinks per week

Ha: $\mu < 4.73$ drinks per week

HINT

CHECK ANSWER

**QUESTION 6:**

Now suppose that instead of the 75 students having been randomly selected from the entire student body, the 75 students had been randomly selected only from the engineering classes at the college (for the sake of convenience).

Address the following two issues regarding the effect of such a change in the study design:

a. Would we still be mathematically justified in using the t-test for obtaining conclusions, as we did previously?

b. Would the resulting conclusions still address the question of interest (which, remember, was to investigate the drinking habits of the students at the college as whole)?

CHECK ANSWER