Homework #5 – Due Tuesday, Aug. 7
STAT-UB.0001 – Statistics for Business Control

Problem 1

For each of the following values of α, and n, find $t_{\alpha/2,n-1}$. Round the answer to two digits after the decimal point.

(a) $\alpha = 0.10$, $n = 25$.

(b) $\alpha = 0.02$, $n = 10$.

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Problem 2

Consider the time it takes for a call center to answer its calls. A random sample of 7 calls revealed a sample mean time of 191 seconds and a sample standard deviation of 11.4 seconds.

(a) What is the sample?

(b) What is the population?

(c) Explain what the population mean represents in this problem.

(d) Construct a 95% confidence interval for the population mean.

(e) Construct a 99% confidence interval for the population mean.

(f) State any assumptions you needed to do this problem. Do you think that the assumptions are reasonable? Why or why not?

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Problem 3

Consider (again) the time it takes for a call center to answer its calls. Assume the time to answer a call is normally distributed. The call center claims that the mean time to answer a call is 3 minutes. In a random sample of 7 calls, the average time for the call center to answer was 191 seconds, with a sample standard deviation of 11.4 seconds.

(a) Provide the null and alternative hypotheses for testing the call center's claim.

(b) Compute the test statistic.

(c) Compute the p-value.

(d) Test the call center's claim, at the 1% level of significance.

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Problem 4

You would like to estimate the proportion of Stern students who participates in course faculty evaluations (CFEs). If you want to construct a 95% confidence interval for this proportion, how many students should you survey to guarantee that the width of your confidence interval will be less than 0.05? *Hint: use the fact that* $\widehat{p}(1-\widehat{p}) \leq \frac{1}{4}$*, for any* $\widehat{p}$ *taking values between* $[0, 1]$.

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Problem 5

Consider the `HeightWeight.csv` file containing data on 200 records of human heights and weights of 18 years old children. Here, we focus on the the Weight (in lb) column. Use Minitab to complete the following questions.

(a) Use *Stat* ⇒ *Basic Statistics* ⇒ *1-Sample t*, and choose `Weight` to create a 95% confidence interval for the population mean.

(b) Use the Minitab output (`N`, `Mean`, `StDev`) to check the calculation of the confidence interval in (a). Also verify the calculation of `SE Mean`, the (estimated) standard deviation for the sample mean.

(c) Get a 99% confidence interval for the population mean, proceeding as in (a) but adding *Options* ⇒ *Confidence Level:* 99.0.

(d) According to Wikipedia, the average weight for adults is 136.7 lb. Use Minitab to get the p-value corresponding to the null hypothesis that the average weight for the 18 years old children is the same as the average weight of the adults. Interpret the p-value. Proceed as in (a) but select *Perform hypothesis test.*

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