Mth 102 – General Education Statistics – Practice Exam 5

NOTE: This exam should not be taken as a complete list of possible problems. It is merely intended to be an example of the length and difficulty level of the regular exam. To best utilize it as a *practice* exam, give yourself 55 minutes with no distractions. Try to emulate the classroom environment as much as possible.

1. Given the two confidence intervals below for the average pulse rate of students at rest, which has a higher level of confidence? Why?

a. 70.9 bpm to 73.5 bpm b. 70.0 bpm to 74.3 bpm

2. Suppose that you have obtained data by taking a random sample from a population. Before performing a statistical inference (like finding a confidence interval), what should you do?

3. Ehlers, Maercker, and Boos studied various characteristics of political prisoners from the former East Germany and presented their findings in the paper "Posttraumatic Stress Disorder (PTSD) Following Political Imprisonment: The Role of Mental Defeat, Alienation, and Perceived Permanent Change." According to the article, the mean duration of imprisonment for 32 patients with chronic PTSD was 33.4 months. Assuming that $\sigma = 42$ months, determine a 95% confidence interval for the mean duration of imprisonment, μ , of all East German political prisoners with chronic PTSD. Interpret your answer in words.

- 4. In each case, state whether a confidence interval for the population mean can reasonably be found under the given conditions. Explain why or why not.
 - a. The variable under consideration is approximately normally distributed, the same size is 20, and the population standard deviation is known.

b. The data are skewed left, the sample size is 20, and σ is known.

c. The data are not normally distributed, n = 40, and you only have the data set – the population standard deviation is unknown.

d. You are given the normal probability plot and box plot shown below. The sample size is 30.



5. In a sample of 10 randomly selected women, it was found that their mean height was 63.4 inches. From previous studies, it is assumed that the standard deviation, σ , is 2.4 inches. Find the 95% confidence interval for the population mean. (Heights of women are known to be normally distributed.)

6. Suppose you would like to determine the average age of ECC students. If we assume that the population standard deviation is 7.7 years, and you would like your estimate to be off by at most 3 years with 95% confidence, how many students do you need to randomly select for your sample?

7. In a study regarding the physical fitness of female graduate physical-therapy students, a sample of 27 students had a mean of 22.46 percent body fat. Assuming that percent body fat of female graduate physical-therapy students is normally distributed with standard deviation 4.10 percent body fat, determine a 95% confidence interval for the mean percent body fat of all female graduate physical-therapy students.

8. Use the heart rate data from class to find a 99% confidence interval for the average heart rate of all daytime Mth102 ECC students. (See me for the list if you do not have it.)

9. In a recent study of 22 eighth graders, the mean number of hours per week that they watched television was 19.6 with a standard deviation of 5.8 hours. Find a 90% confidence interval for the population mean, μ . Assume the population has a normal distribution.

10. Why are confidence intervals for population means using a *t*-interval wider than those using a *z*-interval?

11. In 1908, W.S. Gosset published the article "The Probable Error of a Mean." In this paper, written under the pseudonym "Student," Gosset introduced what later became known as Student's *t*-distribution. Gosset used the following data set, which give the additional sleep obtained by a sample of 10 patients using laevohysocyamine hydrobromide. Find a 95% confidence interval for the additional sleep that would be obtained on average for all people using laevohysocyamine hydrobromide. (*Note:* $\bar{x} = 2.33$ hr; s = 2.002 hr.)

1.9	0.8	1.1	0.1	-0.1
4.4	5.5	1.6	4.6	3.4

12. If you obtained one thousand 95% confidence intervals for a population mean, μ , roughly how many of the intervals would actually contain μ ?