**STAT 145 PRACTICE FOR EXAM 2 Part 2**

Part I of your exam will be a 10-question MyCourses quiz. An OPTIONAL 33-question MyCourses quiz to practice for Exam 2 is available to you.

On exam day, once you submit the Part 1 MyCourses quiz, a Word document becomes available in MyCourses🡪Content along with an Excel file with any data. You will type into this document or create a new document with your answers and technology output.

These practice problems will give you practice with the format and type of questions you can expect on Exam 2. Paste any technology output and type your answer in the space provided. Use complete sentences and be sure you have answered the question and provided an interpretation or explanation when requested.

**Problem #1**

An expert witness testifies in a paternity suit that the length of pregnancy (that is, the time from impregnation to the delivery of the child) is approximately normally distributed with a mean of 268 days and standard deviation of 9 days.

1. If the expert’s testimony is accurate, what is the probability that a pregnancy lasts more than 275 days? Show work/output and clearly state your answer.
2. According to the expert’s testimony, 95% of all pregnancies are shorter than what length of time? Show work/output and clearly state your answer.
3. What are the lower and upper length of pregnancy days for the middle 95% of the data? Show work/output and clearly state your answer.

**Problem #2**

A report in the American Journal of Public Health (AJPH) examined the amount of lead in the printing on soft plastic bread wrappers. The article stated that the mean amount of lead on a wrapper is 26 mg, with a standard deviation of 6 mg. Researchers at RIT will obtain a random sample of 45 soft plastic bread wrappers from local grocery stores.

A. Describe the sampling distribution of the sample means by discussing shape, center and spread.

B. What is the probability that the researchers’ sample mean will be less than 25 mg? Show work/output and clearly state your answer.

C. Complete the sentence: There is an 8% chance that the researchers’ sample mean will be MORE than \_\_\_\_\_ mg. Show work/output and clearly state your answer.

**Problem #3**

Coral reef communities are home to one-quarter of all marine plants and animals worldwide. Marine scientists are concerned about the destruction of coral reefs due to disease and other factors. A recent study of 104 sea fans at the Las Redes Reef in Akumal, Mexico found 54 that were infected with the disease aspergillosis.

A. Estimate the proportion of all Las Redes sea fans that are infected with aspergillosis, with 95% confidence. Interpret the CI in the context of the problem and check the normality assumption.

B. Your research group is preparing a headline for your research paper. A colleague suggests: “At least 40% of all Las Redes sea fans are infected with aspergillosis” Does the 95% confidence interval from this sample data support this statement? Explain.

**Problem #4**

A study of the ability of individuals to walk in a straight line (from “Can We Really Walk Straight” in the American Journal of Physical Anthropology) reported the accompanying data on cadence (strides per second) for a sample of twenty randomly selected healthy men. The data are in the file: 8 Week 8 Review for Exam 2 Data.xlsx under the sheet: **Cadence**.

0.95 0.85 0.92 0.95 0.93 0.86 1.00 0.92 0.85 0.81

0.78 0.93 0.93 1.05 0.93 1.06 1.06 0.96 0.81 0.96

A. Estimate the mean cadences of all healthy men, with 99% confidence. Interpret the CI in the context of the problem and check the normality assumption.

B. A different journal article claims that the mean cadence of healthy men is at most .96 strides per second. Does the 99% confidence interval built from this sample data support this statement? Explain.

**Problem #5**

A random sample of 32 statistics students at a local community college was taken in order to estimate the mean age of all statistics students. The sample mean is 26.4 years with a sample standard deviation of 4.6 years.

A. Estimate, with 90% confidence the mean age of all statistics students at the local community college. Interpret the CI in the context of the problem and check the normality assumption.

B. One professor believes that the mean age is 24.2 years. Does the 90% confidence interval built with this sample data support his belief? Explain.

**Problem #6**

Assume the standard deviation of the heights of five-year old boys is 3.5 inches. How many five-year-old boys should be sampled if we want to use 95% level of confidence to estimate the population mean height within one inch. Show your work and clearly state your answer.

**Problem #7**

A statistical group has been hired to conduct a survey of women golfers’ satisfaction with available tee times. How large should the sample be if the survey director wants to estimate the proportion within 0.025 with 90% level of confidence. Show your work and clearly state your answer.

**Problem #8**

At the beginning of summer term, each of you was asked to take a survey. We will treat the survey participants as a random sample of online students at RIT. We will study the responses to the question: Indicate the number of miles that RIT is from your family home. The data are in the file: 8 Week 8 Review for Exam 2 Data.xlsx under the sheet: **Miles**.

Using technology, build a normal probability plot and paste it here. Based on the graph and P-value, what can you conclude about the assumption of normality?

**Problem #9**

Researchers surveyed a random sample of Americans and then estimated the mean student loan debt for all Americans: The 95% CI for the mean student loan debt of all Americans is

( $26400, $29800 )

A. Find the point estimate for the population mean student loan debt for all Americans.

B. Find the margin of error for this confidence interval.

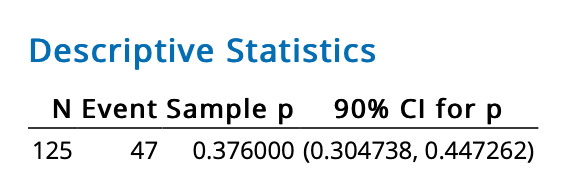
C. Interpret, in the context of the problem, the confidence interval result.

D. The U.S. Department of Education recently stated that “the mean student loan debt in America is $25000”. Based on the given confidence interval, is a mean student loan debt equal to $25000 reasonable? EXPLAIN.

E. Based on the given confidence interval, can you be 95% confident that the mean student loan debt is less than $30000? EXPLAIN.

**Problem #10**

In a 2019 *New York Times* poll on women’s issues, a random sample of American women were polled and asked to indicate if they do or do not get enough time for themselves. A 90% confidence interval was built with the proportion of American women who indicated they DO NOT get enough time for themselves. The Minitab results are below:



A. Find the point estimate for the population proportion of American women who do not get enough time for themselves.

B. Find the margin of error for this confidence interval.

C. Interpret, in the context of the problem, the confidence interval result.

D. Using the descriptive statistics above, determine if the normality assumption has been met for this confidence interval. Show your work and clearly state your answer.

D. The NY Times editor would like to post the following statement: “Over 30% of American women do not get enough time for themselves.” Does the 90% confidence interval support the statement? Explain.

E. You are interested in conducting a similar survey of American women and wonder, what is the minimum sample size needed so that the results will be within 4 percentage points at 95% confidence?