Part 2 of your exam consists of 5 questions and will be completed by typing into this document or placing answers onto a new document. You must have access to statistical technology (StatHelper, Minitab, TI Graphing Calculator, etc.) and are authorized to use a one-sided cheat sheet. You may use a calculator during the exam.

* Follow the directions. If I ask you for your technology output, provide it.
* If I ask for an explanation, write in a complete English sentence.
* If I ask for an interpretation, I am expecting a proper statistical interpretation in the context of the problem.

Take a photo of your cheat sheet and insert the image at the end of this document before submitting.

***On my honor, as a Rochester Institute of Technology student, I have neither given nor received unauthorized assistance in taking this exam. I have not looked up methods or ideas during the course of the exam. Typing your name here acknowledges agreement with this statement.***

**Problem #1**

The length of time it takes for a group of students to complete the SAT is normally distributed with a mean of 2.6 hours and a standard deviation of 0.24 hours. A sample size of *n* = 18 is drawn randomly from the population.

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

B. What is the probability that the that the sample mean time to complete the SAT is less than 2.5 hours? Show work/output and clearly state your answer.

C. Complete the sentence: There is an 10% chance that the sample mean time to complete the SAT will be MORE than \_\_\_\_\_ hours. Show work/output and clearly state your answer.

**Problem #2**

A random sample of 1000 children in New York State (NYS) were polled and 205 stated they had dressed as Spiderman for Halloween in 2019.

A. Estimate, with 90% confidence, the proportion of all NYS children that dressed as Spiderman for Halloween in 2019. Provide your technology output here.

B. Interpret the confidence interval in the context of the problem.

C. Show your work as you decide if the normality assumption has been met. Clearly state your answer.

D. A recent new article stated that 15% of children in NYS were dressed as Spiderman for Halloween. Does the confidence interval that you built support this statement? Explain.

**Problem #3**

The mayor of a small city has suggested that the state construct and operate a new prison there, arguing that the construction project and resulting jobs will be good for the local economy. A total of 183 residents show up for a public hearing on the proposal, and a show of hands finds only 31 in favor of the prison project. **The 95% confidence interval is calculated as (.115, .224).**

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

B. State the point estimate for the proportion of all residents that are in favor.

C. Find the margin of error for the confidence interval.

D. Describe in detail and in a complete sentence what happens to the confidence interval if, instead, a **90%** confidence interval were built. Be specific about your explanation.

**Problem #4**

A US automobile manufacturer is excited about the latest technology in reducing gas mileage in one of its new car models. The sample mean miles per gallon (MPG) and standard deviation for a random sample of 61 cars was found to be 43.6 MPG and 1.3 MPG respectively.

A. Construct a 95% confidence interval for the population mean miles per gallon for a new car model for this US auto manufacturer. Provide your technology output here.

B. Interpret the confidence interval in the context of the problem.

C. Show your work as you decide if the normality assumption has been met. Clearly state your answer.

D. The automobile manufacturer believes that the average mileage per gallon of this new model exceeds (is more than) the mean Environmental Protection Agency rating of 43 miles per gallon. Does the 95% CI support this statement? Explain in a complete sentence.

**Problem #5**

It is very time consuming to find rattlesnakes and nerve racking to measure them. A scientist randomly finds 12 snakes from the Central Pennsylvania area and measures their length. The following twelve measurements, in inches, are obtained:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 40.2 | 43.1 | 45.5 | 44.5 | 39.5 | 38.5 |
| 40.3 | 41.0 | 41.6 | 43.1 | 44.9 | 42.8 |

A. Estimate, with 95% confidence, the population mean length of a rattlesnake from Central PA. Provide your technology output here.

B. Interpret the confidence interval in the context of the problem.

C. Show your work as you decide if the normality assumption has been met. Clearly state your answer.

D. The scientist is planning on making the following statement: “Rattlesnakes from Central PA measure 42 inches in length.” Does the 95% confidence interval that we built support this statement? Explain your answer in a complete sentence.

This is the end of the exam. You should have completed 4 problems. Once you have completed the next two items in red, please submit the file to the Exam 2 Part 2 assignment drop box.

Insert an image of your cheat sheet here: