

Math 263: Excel Assignment 6-Version 2

You must do the work for this assignment yourself, although you may certainly talk to other people. Answers which appear to be copied will be treated as an integrity violation.

1. Topic: Calculating a Confidence Interval

The file *Everglades.xlsx* contains data about the Shark River, Gunboat Island, on the coast of the Gulf of Mexico. When the tide is low, fresh water flows from the river into the Gulf. When the tide is high, salt water flows from the Gulf back up the river. You will estimate the mean salinity of the Shark River at Gunboat Island from the sample of data.

- (a) How many salinity readings are there?
- (b) Make a *point estimate* of the population mean of the salinity. This is a single number estimate, given by the mean of the sample. Give units and two decimal places.
- (c) Find the standard deviation of the sample. (Use = STDEV(array) Give units and two decimal places.
- (d) Find a *95% confidence interval* for the population mean of the salinity. This requires the population standard deviation, which we do not have, so use the sample standard deviation instead. (We will shortly see that with a sample as large as this one, the sample standard deviation is a very good approximation.) Give units. *Please show your calculation of the confidence interval.*

2. Topic: How Often do Confidence Intervals Contain the True Mean?

Confidence intervals do not always contain the true mean of the population. In this question, you will run an applet that simulates confidence intervals and allows you to count how many actually do contain the true mean.

To run the applet:

Put the files *ConfidenceInterval.html* and *ConfidenceInterval.jar* on your computer. Open *ConfidenceIntervals.html* in a browser (you don't need to be on the internet). This runs the applet in *ConfidenceIntervals.jar*.

Read the instructions at the top to see what the applet does. Press Samples 50. What do you see?

The questions to answer

- When you press Samples 50, some confidence intervals are black, some are red. What are the red and black colors showing?
- Create 200 confidence intervals with confidence level of 95%. (To get 200 confidence intervals, click the Samples 50 button four times. You will only be able to see 50 at a time, but the counter keeps track of all 200.) Record the number and percentage of times that the confidence interval contains the true mean in the table below.
- Repeat part (b) for the three other confidence levels shown, 80%, 90% and 99%.
- Fill out the table below. You will need to record the data you observed and calculate what you expect from theory.

Confidence Level	80%	90%	95%	99%
<u>Simulation</u>				
Number of intervals (out of 200) <i>observed</i> to contain population mean				
Percentage of intervals (out of 200) <i>observed</i> to contain population mean				
<u>Theory</u>				
Number of intervals (out of 200) <i>predicted</i> contain population mean				
Percentage of intervals (out of 200) <i>predicted</i> to contain population mean				

Suggestions on Getting the Applet to Run

It is helpful— and maybe essential—to do the following:

- Download both the ConfidenceIntervals.html and ConfidenceIntervals.jar to your computer.
- Double click on the html file; it will open a browser.

It may not work if you open the html file by double clicking it when it is attached to the email; you have to download it first.