

MATH108: Elementary Statistics

Spring 2024

In-Class Activity 02: Foundations of Statistical Inference

Assignment is DUE as indicated on the course schedule. This assignment is designed to be completed in class.

*This is a **group assignment**. Work with 3-5 classmates, and submit as a group on Gradescope.*

Notes

Your final submission must be readable. It is your responsibility to write up your answers in a way that is easy to read and follow.

All group members are expected to contribute to all parts of this assignment.

Part 1 – Set up

For this assignment you will ask and answer a research question about your WSU classmates.

To start, come up with a research question. Your question must investigate what proportion of your classmates in this class think or do something. For example,

- RQ: What proportion of students in this class are currently wearing red?
- RQ: What proportion of students in this class are commuters?
- RQ: What proportion of students in this class like cats?

Once you have your question, collect data for each person in class today to answer it. You must record your data in a table. Remember, a data table must have one row per observation (what is one observation in your study?) and one column per variable (what variables are you collecting data for in your study?).

Start a document for this assignment. Record your research question and data table in it.

Part 2 – Hypothesis Testing

Once you have your data, calculate the sample proportion, \hat{p} , with respect to your research question. Clearly show your work for this calculation.

Now, using your sample proportion as the observation, test whether the population proportion (for all WSU students) is 0.50 using $\alpha = 0.05$.

Steps:

1. Write out your null and alternative hypotheses.
2. Calculate the Z-score for your observation. Show all of your work.
3. Based on your Z-score, how unusual is your observation, assuming the null hypothesis is true?
4. Find the probability of seeing another observation as or more extreme than yours given your null hypothesis.
5. Based on the previous step, do you reject or fail to reject your null hypothesis? What does this tell you in the context of this experiment?

Part 3 – Conceptual

Consider the finding of your hypothesis test.

If you were to create a confidence interval for your \hat{p} , would you expect it to include the value 0.50? Why or why not?

Explain what a Type 1 error would mean in the context of your experiment.

Explain what a Type 2 error would mean in the context of your experiment.

Submission

Submit on Gradescope. Remember to tag your groupmates!

Rubric

	Missing / Not Complete (0)	Approaching (2)	Meets (4)	Exceeds (5)
Readability	Assignment is unreadable or not submitted.	Assignment includes formatting, but significant improvements could be made. For example, clear labeling of problems and subparts, proofreading.	Assignment includes formatting, but minor improvements could be made. For example, clear labeling of problems and subparts, proofreading.	Assignment is well formatted and easy to read. Text has been proofread.
Completeness	Less than half of assignment is attempted.	Roughly half of assignment has been attempted. On the problems that have been completed, effort is evident. OR All of the assignment has been attempted, but effort is not evident in many parts.	At least 80% of assignment has been attempted. On the problems that have been completed, effort is evident. OR All of the assignment has been attempted, but effort is not evident a few parts.	All of the assignment has been attempted, and effort evident throughout.
Correctness	All answers are incorrect or missing.	Of the complete problems, at least half have been approached and completed correctly.	Of the complete problems, at least 80% have been approached and completed correctly.	All complete problems are approached and completed correctly.