

## Exam 1 Review (100 points total)

### Exam 1: Tue 2/17/26 11:00 AM – 12:50 AM

You will have approximately 2 hours to complete the test (please return by 12:50 PM via email), but the exam is designed to be approximately one hour in length. There are no restrictions on use of notes or books or other sources, but you will not likely have enough time to look up all of the answers. You must **complete this exam on your own** and **responses should be in your own words**.

### Short Essay (40 points)

There will be 2 short “essay” questions, 20 points each. Your answers must be **in your own words**. These are open-ended questions on definitions and concepts learned from the readings and lectures. Answers should be about 1 paragraph. I will pick 2 questions from the following set:

- 1) What is a normal distribution and what are the terms used in statistics to distinguish the shape of distributions in relation to the normal distribution? What is a  $z$ -score and what are the descriptive statistical values for  $z$ -scores for any batch of numbers? Why is the normal distribution valuable for comparing scores and comparing samples?
- 2) Define the central limit theorem and define the sampling distribution of the mean. What properties does the sampling distribution of the mean have? Explain why the sampling distribution has the shape it has.
- 3) What is *statistical significance*? Use the test of the comparison of two independent means as an example to describe the purpose of the test in terms of the meaning of significance. Be sure to define the relevant terms used in your answer.
- 4) Define Type I error, Type II error, and power. Is it the case that all studies have a 5% probability of making an incorrect statistical conclusion? Explain why or why not. What three things would increase the power of the  $t$ -test?

### Multiple Choice (30 points)

There will be 15 multiple choice questions worth 2 points each. These may be on any of the assigned reading or the lecture material (including handouts), up to and including Feb 12. The purpose of these questions is to make sure you have read the material and have learned the concepts from the text and class lecture.

### Computations and Printout Interpretation (30 points)

There will be two short computational or printout interpretation problems (15 pts each). Please have a calculator handy and have ready access to any statistical tables you might need. You may want to consider organizing potentially needed formulas beforehand.

Computations may include following:

Standard deviation, variance, and mean  
Independent samples  $t$  test

Be able to interpret (write-up) printouts for:

Descriptive statistics (mean, median, standard deviation, variance, skew, kurtosis)  
Graphs (box plot, frequency histogram)  
Independent-samples  $t$  test