

Exam 1 Study Guide

STAT 251 Section 03

January 28, 2024

- Know the “anatomy” of data (i.e., observations and variables, quantitative and categorical variables).
- Be able to identify the different types of quantitative and qualitative variables.
- Understand samples versus populations.
- Understand statistics versus parameters.
- Understand descriptive versus inferential statistics.
- What is meant by a distribution?
- Be able to construct a frequency table from a small set of observations and know to find the frequency, relative frequency, and cumulative relative frequency
- Know how to construct a dot plot, stem plot, and a histogram given a small set of observations.
- Be able to compute a mean, median, and mode given a small set of observations. Note that you should also know how to compute a mean using a frequency table.
- Know how to compute a proportion
- Know how to find the modal category of a qualitative variable
- Be able to compute and interpret the variance and standard deviation given a small set of observations
- Know how to compute the five-number summary of a variable.
- Understand how plot a cumulative distribution and use it to find the percentiles or quartiles of a distribution.
- Know how a box plot is constructed from a five number summary.
- Know how to interpret the shape (symmetry, skew, modality) of a distribution and how it is related to the mean and median
- Know how to use the $1.5 \times IQR$ to identify outliers.
- Understand what it means to say that a summary measure is resistant to outliers, and which summary measures we have discussed that are resistant and which are not
- Be sure you understand the notation (i.e., symbols) we have used so far (e.g., $n, N, s, s^2, \bar{x}, \mu, \sigma, \sigma^2$)

The following formulas will be provided on the the exam

$$\bar{x} = \frac{1}{n} \sum_{i=1}^n x_i, \quad \bar{x} = \frac{1}{n} \sum_x xF(x), \quad \bar{x} = \sum_x xRF(X)$$

$$s^2 = \frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x})^2, \quad s = \sqrt{\frac{1}{n-1} \sum_{i=1}^n (x_i - \bar{x})^2}$$

$$\text{range}(x) = \min(x) - \max(x), \quad IQR = Q3 - Q1$$

$$x < Q1 - 1.5 \times (Q3 - Q1), \quad x > Q3 + 1.5 \times (Q3 - Q1)$$