

# Midterm Topics

STATS 67 - Fall 2025

Students can

## Week 1

- identify rows and columns, observations, and variables of a data frame.
- differentiate categorical and numerical variables and calculate corresponding statistics such as proportion and mean.
- understand the statistics mean, median, first quartile, third quartile, interquartile range, proportion, standard deviation and variance.
- interpret any data visualization.
- know which type of plot (e.g., histogram, box plot, scatterplot, bar plot) would be appropriate for the type of data.

## Week 2

- identify the sample and population in a given news article, research study excerpt etc.
- identify the sampling method.
- identify sources of bias.
- identify study design and its components.
- identify response, explanatory, and (potential) confounding variables.
- make meaningful conclusions considering sampling design and study design.
- identify joint, marginal, and conditional probability and calculate them.
- draw and interpret Venn diagrams.

### **Week 3**

- identify whether a random variable is discrete or not.
- identify appropriate discrete distribution: Bernoulli, geometric, binomial, Poisson.
- calculate probability using any given discrete distribution.
- calculate expected value and variance of any discrete random variable.
- interpret pmf and cdf plots.
- do calculations for given pmf and cdf.

### **Week 4**

- identify whether a random variable is continuous or not.
- identify appropriate continuous distribution: Normal, Exponential, Uniform.
- calculate probability using any given continuous distribution.
- calculate expected value and variance of any continuous random variable.
- interpret pdf and cdf plots.
- do calculations for given pdf and cdf.

### **Topics Across All 4 Weeks**

- read any R code that we have covered and understand the output it displays.
- write any R functions and arguments from lectures 3b (discrete distributions), and 4b (continuous distributions).
- use correct mathematical notation consistent with the notation we used in class.