



Midterm 1: Topics

PSTAT 5A: Spring 2023, with Ethan P. Marzban

! IMPORTANT NOTE

This list is not meant to be comprehensive: just because a topic/concept does not appear below does not mean it isn't fair game for the first Midterm. Conversely, just because something *does* show up below doesn't mean it is guaranteed to appear on the exam. Your best resource for reviewing are the notes you have (hopefully) been creating each lecture.

Descriptive Statistics (Chapter 2 of *OpenIntro Statistics*)

- Structure of data and data representation
 - Data matrix / observational units / variables
 - Data as a *set* / data aggregation
- Classification of variables
- Appropriate visualizations for numerical and categorical data
 - Barplots
 - Histograms
 - Boxplots
- Appropriate visualizations of the relationship between variables
 - Numerical vs. numerical (scatterplot)
 - Numerical vs. categorical (side-by-side boxplot)
 - Categorical vs. categorical (contingency table)
- Numerical summaries of data
 - Measures of central tendency (mean, median)
 - Measures of spread (range, variance, standard deviation, IQR)
 - Five-number summary
- Transformations (HW01)

Probability (Chapter 3 of *OpenIntro Statistics*)

- Basics of probability
 - Experiment
 - Outcomes / outcome space / different representations of outcome spaces
 - Events
 - Probability as a function
 - Two approaches to probability (long-run frequency and classical)

- Equally likely outcomes
- Set operations
 - Union / intersection / complement
 - DeMorgan's Laws
 - Venn Diagrams
- Probability rules
 - Probability of the empty set
 - Complement Rule
 - Addition Rule
 - Axioms of probability
- Counting
 - Fundamental principle of counting
 - Slot diagrams
 - Sampling with/without order
 - $n!$, $(n)_k$, $\binom{n}{k}$
- Conditional probability
 - Definition of $\mathbb{P}(E | F)$
 - Independence of events (HW03)

Programming (Labs 1, 2, and 3)

- General terminology
 - Code cells
 - Running / executing code
 - Expressions
 - Order of operations
 - Variable assignment/re-assignment
 - Modules
 - Different Types of Error
- Data Types
- Data Classes (lists, arrays, tables)
- Comparisons
- Conditional expressions
- Functions
 - Docstring
 - Return statement