

APMA 1650 Midterm 1 Checklist

Here is a checklist of topics to help you review for the first midterm. It is meant to serve as a guide to help with studying for the exam.

Basics of set theory

1. Sets, elements, universal set, empty set, subset, union, intersection, disjoint, complement, relative complement, Venn Diagrams
2. Compositions and algebraic properties of set operations, DeMorgans' law

Basics of probability

1. Experiments, sample space S , event, simple event/outcome, mutually exclusive
2. Probability measure, axioms of probability, non-negativity, normality, countable additivity
3. Law of complement, addition, differences, inclusion-exclusion principle

Conditional probability and Bayes rule

1. Conditional probability, law of multiplication, law of total probability
2. Probability Trees, how to draw them, how to use them
3. Independence of events, how does this relate to conditional probability?, how to check if two events are independent, what does it mean?
4. Bayes rule, how to invert conditional probabilities, base rate fallacy

Discrete probability and Combinatorics

1. Discrete sample space, sample point method
2. Equally likely events and counting, rule of products, permutations, combinations, partitions
3. Sampling: ordered/unordered with/without replacement, what do they mean? Be able to identify each situation.

Discrete random variables and common distributions

1. Discrete random variable, probability mass function, independent random variables
2. Bernoulli, binomial, geometric, Pascal, hypergeometric, Poisson distributions, know the properties and what they describe
3. Cumulative distribution expected value, functions of a random variable, variance, what do they mean, how to interpret them