

# 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.

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## Basics of set Theory

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

## Basics of Probability

1. Experiment, sample space  $S$ , event, simple event, mutually exclusive
2. Probability measure, axioms, non-negativity, normality, countable additivity
3. Law of complement, addition, differences

## Discrete Probability and Combinatorics

1. Discrete sample space, sample point method, probability tables
2. Equally likely events and counting, rule of products, permutations, combinations, partitions

## 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

## Random Variables and common distributions

1. Discrete random variable, probability distribution
2. Expected value, variance, what do they mean, how to interpret them?
3. Bernoulli, binomial, geometric, Poisson distributions, know the properties and what they describe (formulas will be provided)
4. Chebyshev inequality, how to bound probabilities, weak law of large numbers,