

MAT 2377 Cheat Sheet

1 Chapter 1: Probabilities

1.1 Sample Spaces

The **sample space** is the set of all possible outcomes.

An **event** is a collection of outcomes in the sample space. Usually this is what we are looking to work with.

1.2 Counting Techniques

We can count items using the k stage procedure.

If we have k stages, each with n_1, n_2, n_3, \dots possibilities, then the total number of possibilities is just $n_1 \cdot n_2 \cdot n_3 \cdot \dots \cdot n_k$.

1.3 Ordered Samples

If we have an ordered sample, then we see that picking 1, 2, 3 is different than picking in a different order 1, 3, 2.

If we draw r items from a bag of n items:

- If we replace each item after drawing, we have: $n \cdot n \cdot n \cdot \dots = n^r$ possibilities
- If we do NOT replace the items, we have: $n \cdot (n-1) \cdot (n-2) \cdot \dots \cdot (n-r) = \frac{n!}{(n-r)!} = {}_nP_r$

1.4 Unordered Samples

1.5 Conditional Probabilities

1.6 Law of Total Probability

1.7 Bayes Theorem

2 Chapter 2: Discrete Random Variables