**Probabilities**

**Class Notes**

Probabilities and data analytics are closely related fields that play a fundamental role in various aspects of statistics, machine learning, and decision-making. Let's explore the key concepts and their significance in both areas:

**1. Probability Theory:**

**Definition:** Probability theory is a branch of mathematics that deals with uncertainty and randomness. It provides a framework for quantifying the likelihood of events occurring.

**Key Concepts:**

**Probability:** It assigns a number between 0 and 1 to an event, where 0 indicates impossibility, 1 indicates certainty, and values in between represent varying degrees of likelihood.

**Random Variables:** These are variables that can take on different values with associated probabilities.

**Probability Distributions:** These describe the likelihood of each possible outcome of a random variable. Common distributions include the uniform, normal (Gaussian), binomial, and Poisson distributions.

**Conditional Probability:** It calculates the probability of an event occurring given that another event has occurred. It's denoted as P(A|B), where A and B are events.

**Bayes' Theorem:** It is used to update probabilities based on new information or evidence.

**Skill and chance:** know the difference. Data Analytics deals with the chance events. For example, counting cards is a skill and is illegal in casinos.