

## Chapter 3 — Probability Summary

### 1. Probability vs. Statistics

- A **random sample** is a special kind of sample where there is some uncertainty as to which members of the population will be selected.
- **Probability** takes information about a population, and allows us to make statements about what a random sample taken from that population might look like.
- **Statistics** takes information about a random sample, and seeks to make inference about the properties of the population from which the random sample was drawn.
- A numerical property of a population is often called a **population parameter**, or simply a **parameter**.

### 2. Definitions of Probability

- A **random process** is any process that generates data in which the result has some amount of random chance or uncertainty involved.
- An **outcome** is a distinct result of a random process.
- An **event** is a collection of outcomes.
- Two events are said to be **independent** if the observed outcome of the first event does not change the probability of the second event, or vice versa. If two events are not independent, we call them **dependent**.
- If two events are independent, then the probability that they both occur is the product of the individual probabilities of the events.