* **(Definition 1.1, page 9) Mean**
* **(Definition 1.2, page 10) Variance:**
* **(Definition 1.3, page 10) Standard Deviation:** 
  + Step 1: average set; is set and is mean
  + Step 2: subtract average from all elements
  + Step 3: square these deviations
  + Step 4: sum these squares
  + Step 5: divide by count; N is count
  + Step 6: square root
* **Empirical Rule (page 10): used for normal distribution problems (Gaussian Distribution, Bell curves) where is the “expected” (or average) and is the standard deviation**
  + contains 68% of the measurements
  + contains 95% of the measurements
  + contains 99.7% of the measurements
* **Distributive Laws in Set Theory (page 25)**
* **De Morgan’s Laws in Set Theory (page 25)**
* **Corollaries**
* **Calculating Probability of Event / Sample-Point method (page 36)**
  + Determine common events (S=E1,E2,…En)
  + Assign probabilities to each event (P(E1)=x)
  + Pick out with events are of interest (A)
  + Use in probability equation (P(A)=?)
* **(Theorem 2.2, page 43) Permutations:** an ordered arrangement of r distinct objects
* **(Theorem 2.3, page 44) Multinomial Coefficients:** the number of ways of partitioning n distinct objects into **k** disjoint subsets of sizes **n1,n2,…nk**
* **(Definition 2.9, page 52) Conditional Probability:** the probability of A if B has already occurred
  + **as long as P(B)>0**
  + Note: This formula is not reversible
* **(Definition 2.10, page 53) Independent Events: If any of the following are true, then the events are independent, meaning the probability of A is unaffected by the probability of B.**
* **(Theorem 2.5, page 57) Multiplicative Law of Probability: the probability of the intersection of two events A and B,**
  + **If independent:**
  + **Otherwise:**
* **(Theorem 2.6, page 58) General Addition Rule/The Additive Law of Probability** 
  + **If mutually exclusive (where ):**
  + **Otherwise:**
  + **With three events:**
* **(Theorem 2.8, page 70) Theorem of Total Probability: assuming ,**
* **(Theorem 2.9, page 71) Bayes Theorem:** used to make probability statements concerning an event B that has not been observed, but A has been observed
  + **With P(A)>0 and P(B)>0:**
  + **If 0<P(B)<1:**
* **Probability Mass Function:** the function that records how probability is distributed across points in R, where (Y=y) represents the set of all points in S assigned the value y by random variable Y, and P(Y=y) represents the probability that Y takes on the value of y
  + p(y) must be 0≤p(y)≤1 for all y
  + the summation over all y values must equal to 1
* **(Definition 3.4, page 91) Expectation of a discrete random variable**
* **(Definition 3.5, page 93)**
  + **Variance of a discrete random variable:**
  + **Standard Deviation:**
* **(Definition 3.6, page 101) Binomial Experiment requirements:**
  + **Rule 1:** must consist of a fixed number, **n**, of identical trials
  + **Rule 2:** trial results in one of two outcomes: either success (S) or failure (F)
  + **Rule 3:** the probability of success on a single trial is equal to some value **p** and remains the same from trial to trial and the probability of failure is equal to **q=(1-p)**
  + **Rule 4:** The trials are independent
  + **Rule 5:** The random variable of interest, **Y**, is the number of success observed during n trials
* **(Definition 3.7, page 103) Binomial Distribution pmf**
* **(Theorem 3.7, page 107) Expected and Variance of Binomial Distributions**
  + Expected:
  + Variance:
* **(Definition 3.8, page 115) Geometric Distribution:** 
  + Success occurs on or before the nth trial:
  + Success occurs before the nth trial:
  + Success occurs on or after the nth trial:
  + Success occurs after the nth trial:
* **(Theorem 3.8, page 116) Expected and Variance of Geometric Distribution**
  + **Expected:**
  + **Variance:**
* **(Definition 3.10, page 126) Hypergeometric Distribution**
* **(Theorem 3.10, page 127) Expected and Variance of Hypergeometric Distribution**
  + **Expected:**
  + **Variance:**
* **(Definition 3.11, page 132) Poisson Distribution**
* **(Theorem 3.11, page 134) Expected and Variance of Poisson Distribution**
  + **Expected:**
  + **Variance:**
* **(Theorem 3.14, page 146) Tchebysheff’s Theorem**
* **(Definition 4.1, page 158) Continuous Random Variable Distribution Function:** Let Y denote any random variable. The distribution function of Y, denoted by F(y), such that
* **(Theorem 4.1, page 160) Distribution Function Properties:**
  + 1)
  + 2)
  + 3) F(y) is a nondecreasing function of y; if x and y are any values such that x < y then F(x) ≤ F(y)
* **(Definition 4.3, page 161) Probability Density Function:** Let F(y) be the distribution function for a continuous random variable Y.
* **(Theorem 4.2, page 162) Probability Density Function Properties:** If f(y) is a density function for a continuous random variable, then
  + 1)
  + 2)
* **(Definition 4.5, page 170) Expected and Variance of Continuous Random Variables**
  + **Expected:**
  + **Variance:**
* **(Definition 4.6, page 174) Uniform Probability Distribution:** If a < b, a random variable Y is said to have a continuous uniform probability distribution on the interval (a,b) if and only if the density of Y is
* **(Theorem 4.6, page 176) Expected and Variance of Uniform Probability Distribution**
  + **Expected:**
  + **Variance:**