Formula sheet

Def 1.1: The **mean** of a sample of n measured responses y1, y2,..., yn is given by

The corresponding population mean is denoted μ.

Def 1.2: The **variance** of a sample of measurements y1, y2,..., yn is the sum of the square of the differences between the measurements and their mean, divided by n − 1. Symbolically, the sample variance is

The corresponding population variance is denoted by the symbol .

Def 1.3: The **standard deviation** of a sample of measurements is the positive square root of the variance; that is,

The corresponding population standard deviation is denoted by

Theorem 2.3: permutation partitions (pg. 44)

Def 2.7: An ordered arrangement of distinct objects is called a **permutation**. The number of ways of ordering n distinct objects taken r at a time will be designated by the symbol

Def 2.8: The number of **combinations** of n objects taken r at a time is the number of subsets, each of size r, that can be formed from the n objects. This number will be denoted by or

Theorem 2.4: The number of unordered subsets of size r chosen (without replacement) from n available objects is

Def 2.9: The **conditional probability** of an event A, given that an event B has occurred, is equal to

provided P(B) > 0. [The symbol P(A|B) is read “probability of A given B.”]

Two events A and B are said to be **independent** if any one of the following holds:

P(A|B) = P(A),

P(B|A) = P(B),

P(A ∩ B) = P(A)P(B).

Otherwise, the events are said to be **dependent**.

Theorem 2.9: **Bayes’ Rule** Assume that {B1, B2,..., Bk } is a partition of S (see Definition 2.11) such that P(Bi) > 0, for i = 1, 2,..., k. Then

Theorem 3.2 (pg. 93): Let Y be a discrete random variable with probability function p(y) and g(Y) b e a real-valued function of Y. Then the expected value of g(Y ) is given by

Theorem 3.5 (pg. 93): If Y is a random variable with mean E(Y)=μ, the variance of a random variable Y is defined to be the expected value of (Y−μ)2.That is,

Let Y be a discrete random variable with probability function p(y),g(Y)be a function of Y,and c be a constant. Then

Theorem 3.7 (pg. 107): Let y be a binominal variable based on n trials and success probability p. Then

Def 3.7 (pg. 103): A random variable Y is said to have a **binomial distribution** based on n trials with success probability p if and only if

Def 3.8 (pg. 115): A random variable Y is said to have a **geometric probability distribution** if and only if

Theorem 3.8 (pg. 116): If Y is a random variable with a geometric distribution,