Definition 1.1

The **mean** of a sample of n measured responses . . . is given by

The corresponding population mean is denoted μ.

Definition 1.2

The **variance** of a sample of measurements . . . 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 .

Definition 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 σ

Definition 2.7

An ordered arrangement of *r* 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

= n (n – 1) (n − 2) ··· (n − r + 1) =

Definition 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 ).

= n (n – 1) 0(n − 2) ··· (n − r + 1) =

Definition 2.9

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

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

Definition 3.7

A random variable Y is said to have a **binomial distribution** based on n trials with success probability p if and only if

Definition 3.8

A random variable Y is said to have a **geometric probability distribution** if and only if

Definition 3.10

A random variable Y is said to have a **hypergeometric probability distribution** if and only if

where y is an integer 0, 1, 2, ... n, subject to the restrictions y ≤ r and n − y ≤ N − r.

Definition 3.11

A random variable Y is said to have a **Poisson probability distribution** if and only if , y = 0, 1, 2, ..., λ> 0.

Definition 4.4

Let g(Y ) be a function of Y ; then the expected value of g(Y ) is given by

E(Y) =

provided that the integral exists.