Def. 1.1

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

The corresponding population mean is denoted by

Def. 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

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

Def. 2.6

Suppose *S* is a sample space associated with an experiment. To every event *A*

in *S* (*A* is a subset of *S*), we assign a number, *P(A)*, called the *probability* of

*A*, so that the following axioms hold:

Axiom 1: *P(A)* ≥ 0.

Axiom 2: *P(S)* = 1.

Axiom 3: If  *. . .* form a sequence of pairwise mutually

exclusive events in *S* (that is, ), then

Def. 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 .

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 .

Def. 2.9

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

,

provided .

Def. 2.10

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

Otherwise, the events are said to be dependent.

Def. 2.11

For some positive integer *k*, let the sets be such that

1)

2) for

Then the collection of sets is said to be a partition of

Def. 3.2

The probability that *Y* takes on the value *y,* is defined as the sum of the probabilities of all sample points in *S* that are assigned the value *y*. We will sometimes denote by .

Def. 3.3

The probability distribution for a discrete variable *Y* can be represented by a formula, a table, or a graph that provides for all *y.*

Def. 3.4

Let *Y* be a discrete random variable with the probability function . Then the expected value of is defined to be

Def. 3.5

If *Y* is a random variable with mean , the variance of a random variable *Y* is defined to be the expected value of . That is, .

The standard deviation of *Y* is the positive square root of .

Def. 3.6

A binomial experiment possesses the following properties:

1. The experiment consists of a fixed number, *n,* of identical trials.

2. Each trial results in one of two outcomes: success, *S*, or failure, *F*.

3. The probability of success on a single trial is equal to some value *p* and remains the same from trial to trial. The probability of a failure is equal to

4. The trials are independent.

5. The random variable of interest is *Y*, the number of successes observed during the *n* trials.

Def. 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

Def. 3.8

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

Def. 3.9

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

Def. 3.10

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

Where *y* is an integer . subject to the restrictions and

Def. 3.11

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