Definition 1.1: Mean

Definition 1.2: Variance

Definition 1.3: Standard deviation

Definition 2.6: If event *A* is a subset of *S*, the following axioms hold:

Axiom 1:

Axiom 2: P(S) = 1

Axiom 3: P() =

Theorem 2.2: Permutation

Theorem 2.3: Distinct Subsets (N)

N =

Theorem 2.4: Combination

Definition 2.9: Conditional Probability

Definition 2.10: Two events are *independent* if any of the following holds:

Theorem 2.5: The Multiplicative Law of Probability:

If A and B are independent:

Theorem 2.6: The Additive Law of Probability

If A and B are mutually exclusive, and

Theorem 2.7:

Theorem 2.8:

Theorem 2.9: Bayes’ Rule

Definition 3.4: Expected Value of discrete random variable Y with probability function p(y)

Theorem 3.2: Expected value of g(Y):

Theorem 3.5:

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

,

Theorem 3.7: Let Y be a binomial random variable based on *n* trials and success probability *p.* Then,

and = *n p q*

Definition 3.8: A random variable *Y* is said to have a *geometric probability distribution* if and only if

p(y) = ,

y = 1, 2, 3, . . . , 0

Theorem 3.8: If Y is a random variable with a geometric distribution,

and