**Def 1.1Mean**

**Def 1.2 Variance**

**Def 1.3 – Standard Deviation**

**S =**

**Population Standard Deviation**

**σ = √σ2**

**Def 2.7 – Permutation**

**Permutation Equation**

**Def 2.8 Combination**

**Combination Equation =**

**Def 2.9 Conditional Probability**

**Conditional Probability** 𝑃 =

**2.10 – Independence/Dependence** Events A and B are independent if:

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

If not events are dependent

**Theorem 2.5 - The Multiplicative Law of Probability**

If events are dependent,

𝑃(𝐴 ⋂ 𝐵) = 𝑃(𝐴)𝑃(𝐵|𝐴) = 𝑃(𝐵)𝑃(𝐴|𝐵)

If events are independent,

𝑃(𝐴 ⋂ 𝐵) = 𝑃(𝐴)𝑃(𝐵)

If events are mutually exclusive,

𝑃(𝐴 ⋂ 𝐵) = 0 AND

𝑃(𝐴 ∪ 𝐵) = 𝑃(𝐴) + 𝑃(𝐵)

**Theorem 2.6 – The Additive Law of Probability**

𝑃(𝐴 ∪ 𝐵) = 𝑃(𝐴) + 𝑃(𝐵) − 𝑃(𝐴 ⋂ 𝐵)

**Theorem 2.7 – Complement**

𝑃(𝐴) = 1 − 𝑃()

**Theorem 2.8 – Theorem of Total Probability**

Theorem of Total Probability: 𝑃(𝐴) = ∑𝑛𝑖=1 𝑃(𝐴|𝐵𝑖)𝑃(𝐵𝑖)

**Theorem 2.9 – Bayes’ Rule**

Bayes’ Rule: P

**Definition 3.4 – Discrete Random Variable**

When Y is discrete random variable

Expected Value: 𝐸(𝑌) = ∑𝑦 𝑦𝑝(𝑦)

Variance: 𝑉(𝑌) = 𝐸[(𝑦 − 𝐸(𝑌))2]

Standard Deviation: S(Y) =

**Definition 3.7 – Binomial Distribution**

Binomial Distributions: p(y)=

Expected Value: E(Y)= np

Variance: V(Y) = npq

Standard Deviation:

**Definition 3.8 – Geometric Probability Distribution**

Geometric Distributions: 𝑝(𝑦) = 𝑞𝑦−1𝑝

Expected Value: E(Y) =

Variance: V(Y) =

Standard Deviation: