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**Project 2 Formula Sheet**

**Hypergeometric Distribution:**

where is an integer subject to the restrictions

and

* N = total number in set
* n = total number selected
* r = total number in subset
* y = number in subset we want
* **Expected (Theorem 3.10):**
* **Variance (Theorem 3.10):**
* **Standard Deviation:**

**Negative Binomial Distribution (Def 3.9):**

* **Expected (Theorem 3.9):**
* **Variance (Theorem 3.9):**

**Poisson Distribution (Def 3.11):**

* **Expected (Theorem 3.11):**
* **Variance (Theorem 3.11):**

**Tchebysheff’s Theorem (Theorem 3.14):**

or

**Probability Distribution Function (Def 4.1):**

for

**Properties of Distribution Functions (Theorem 4.1):**

1. is a nondecreasing function of y. [If and are *any* values such that , then ]

**Probability Density Function (Def 4.3):**

and it follows that

**Properties of Density Functions (Theorem 4.2):**

1. for all y,

**Probability Between Intervals (Theorem 4.3):**

**Expected (Continuous Random Variables) (Def 4.5):**

provided the that the integral exists

**Expected of a Function (Theorem 4.4):**

**Expected of Function Rules (Theorem 4.5):**

**Variance (Continuous Random Variables) (Example 4.6):**

**Uniform Distribution (Def 4.6):**

* **Expected:**
* **Variance:**

**Gamma Distribution (Def 4.9):**

where

* **Expected:**
* **Variance:**

**Chi-square Distribution (Def 4.10):**

Let v be a positive integer. A random variable Y is said to have a chi-square distribution with v degrees of freedom if any only if Y is a gamma-distributed random variable with parameters and

* **Expected:**
* **Variance:**

**Exponential Distribution (Def 4.11):**

A random variable Y is said to have exponential distribution with parameter if and only if the density function of Y is

* **Expected:**
* **Variance:**

**Bivariate (Joint) Distributions (Def 5.1):**

or

**Joint Mass Function Properties (Theorem 5.1):**

1. for all
2. where the sum is over all values that are assigned nonzero probabilities

**Bivariate Distribution Function (Def 5.2):**

**Marginal Probability Functions (Def 5.4):**

and

**Marginal Density Functions (Def 5.4):**

and

**Conditional Discrete Probability (Def 5.5):**

**Conditional Distribution Function (Def 5.6):**

**Conditional Density Function (Def 5.7):**

or