**Formula Sheet**

**Chapter 1**

Standard Deviation:

Variance:

**Chapter 2**

Combination:

Permutation:

Conditional Probability:

P(A|B) is read as *Probability of A given B already occurred*

Theorem of Total Probability:

Bayes Theorem:

Note: Bayes’ Theorem is the reverse conditional probability.

Independence Tests:

A variable is said to be **independent** if any holds true, and is **dependent** otherwise.

**Chapter 3**

Probability Mass Function:

Expected Outcome of random variable:

Standard Deviation (with a random variable):

Variance:

Binomial Distribution:

→

→

Geometric Distribution:

→

→

Derived formulas from Geometric Dist:

Hypergeometric Distribution:

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→

Negative Binomial Distribution:

→

→

Poisson Distribution:

Where *k* is the total number of events, and *n* is the number units.

Chebyshev’s Theorem: or

→ Where *k* is the “within” number divided by standard deviation, *k* > 1

**Chapter 4**

Cumulative Distribution Function: for

Expected:

Uniform Distribution:

0, elsewhere

→

→

Normal Distribution: where

Gamma Distribution: where

Exponential Density Function: where

Beta Distribution: where

Where:

Incomplete Beta Function:

**Chapter 5**

Joint Probability Function: where and

, and

Marginal and Conditional Probability:

Independent Random Variables: