Formula Sheet for Exam 1

For a relative frequency table:

Relative Frequency = $\dfrac{Frequency}{n}$

To Calculate the Mean:

$$\overline{x} = \frac{\sum_{i=1}^{n} X_i}{n}$$

To Calculate the Median:

Guidelines for calculating the sample Median:
Arrange the sample data from smallest to largest.

- If n is odd, M is the middle number
- If n is even, M is the mean of the two middle numbers

To Calculate the Variance:

$$s^2 = \frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)}$$

To Calculate the Standard Deviation:

$$s = \sqrt{s^2} = \sqrt{\frac{n\sum x^2 - \left(\sum x\right)^2}{n(n-1)}}$$

Theorems Relating to Distributions:

The following Theorems can be used to determine what range of data values we can expect from a given distribution, and it can also be used to determine what percent of the data will lie within K standard deviations from the mean:

Chebyshev's Theorem: The proportion of any set of data lying within K standard deviations of the mean is always at least $1 - \dfrac{1}{K^2}$, where K > 1.

Note: $K = \dfrac{UL - \mu}{\sigma}$

Empirical Rule

Approximately 68% of the data lies within 1 standard deviation of the mean.
Approximately 95% of the data lies within 2 standard deviations of the mean.
Approximately 99.7% of the data lies within 3 standard deviations of the mean.

Z-scores: $Z = \dfrac{x - \mu}{\sigma}$