Formula Sheet II

Chapter 4: Discrete Random Variables

Expected Value of a Discrete Random Variable:

$$E(X) = \sum_{i=1}^{m} x_i P(x_i)$$

Standard Deviation of a Discrete Random Variable:

$$\sigma(X) = \sqrt{\sum_{i=1}^{m} [x_i - E(X)]^2 P(x_i)}$$

Binomial Formula:

$$\Pr(x) = \binom{n}{x} \Pi^x (1-\Pi)^{n-x}, \qquad \text{for } x = 1, 2, ..., n$$

Expected Value Binomial RV: $E(X) = n\Pi$

SD of Binomial RV: $\sigma(X) = \sqrt{n\Pi(1-\Pi)}$

Chapter 5: Continuous Random Variables

Standard Normal:

$$Z = \frac{X - \mu}{\sigma}$$

Normal Approximation to the Binomial:

The normal is a reasonable approximation to the binomial as long as $n\Pi > 5$ when $\Pi < 1/2$ and $n(1-\Pi) > 5$ when $\Pi > 1/2$.

Chapter 6: Sampling Distributions

Sample Means

Mean and Standard Distribution of Sample Means

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}}$$

$$E(\bar{X}) = \mu$$

The Central Limit Theorem states that for n sufficiently large (at least 30 in practice), the sampling distribution of the means will be approximately normal.