Formula Sheet for Exam II

You may write on this side of the formula sheet.

$P(A) = \frac{n(\mathbf{A})}{n(\mathbf{S})}$

$P(\mathbf{A}^C) = 1 - P(A)$

$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$

$P(A|B) = \frac{P(A \text{ and } B)}{P(B)}$

$P(A \text{ and } B) = P(A|B) * P(B) = P(B) * P(A|B)$

Disjoint Events: $P(A \text{ and } B) = 0$

Independent events: $P(A|B) = P(A)$ $\quad P(B|A) = P(B)$

$P(A \text{ and } B) = P(A) * P(B)$

Properties of a discrete probability distribution:

1. $0 \le P(x) \le 1$ 2. $\Sigma P(x) = 1$

$\mu = \Sigma[xP(x)]$

Binomial probability: $P(X = x) = P(x) = \frac{n!}{x!(n-x)!}(p^x q^{n-x})$ where $x = 0,1,2,\ldots,n.$

For binomial random variable: $\mu = np$ and $\sigma = \sqrt{npq}$

Empirical Rule for bell shaped data sets:

- Approximately 68% in of observations fall within 1 standard deviation of the mean
- Approximately 95% in of observations fall within 2 standard deviations of the mean
- Approximately 99.7% in of observations fall within 3 standard deviations of the mean

$\mathbf{z} = \frac{\mathbf{x} - \mu}{\sigma}$