Test Chapters 4 and 5 Formulas

If a sample space has n EQUALLY LIKELY outcomes and an event E is a subset of the sample space with x outcomes then $P(E) = \frac{x}{n}$

Formal Addition Rule for OR

$P(A \text{ or } B) = P(A) + P(B)$ if A and B are disjoint

$P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$ if A and B are NOT disjoint

Formal Multiplication Rule for AND

$P(A \text{ and } B) = P(A) \bullet P(B)$ if A and B are independent

$P(A \text{ and } B) = P(A) \bullet P(B \mid A)$ if A and B are NOT independent

Rule of Complementary Events

$P(A) + P(\overline{A}) = 1$

The number of **Combinations** of **r** items selected from **n** different items without replacement where each **different ordering of the same items** is counted as the **same combination** is found by

$$_nC_r = \frac{n!}{(n-r)!\,r!}$$

The number of **Permutations** of **r** items selected from **n** different items without replacement where each **different ordering of the same items** is counted as a different **permutation is** found by

$$_nP_r = \frac{n!}{(n-r)!}$$

The total number of **Permutations** of n items using all n items without replacement where one item occurs n_1 times and a second item occurs n_2 times and a third item occurs n_3 times ... etc.

$$= \frac{n!}{n_1! \bullet n_2! \bullet n_3! \bullet \bullet \bullet n_k!}$$

Binomial Distribution Formulas

$\sum P(x) = 1$ for all possible values for x **and** $0 \le P(x) \le 1$ for all values of x

$P(x) = {}_nC_x \bullet p^x \bullet q^{n-x}$ $\mu_x = n \bullet p$ and $\sigma_x = \sqrt{n \bullet p \bullet q}$

The Binomial Probability Distribution can be considered **approximately Normal** or bell shaped if

***p* = .5 or if** $n \bullet p \ge 5$ **AND** $n \bullet q \ge 5$ **are both true**

Usual Values for a Normal Distribution

x is usual if $\mu_x - 2\sigma_x \le x \le \mu_x + 2\sigma_x$