Formula Sheet (STAT-319-First Exam)

Sample Mean: $\overline{X} = \frac{\sum X_k}{n}$

Variance: $s^2 = \frac{\sum (X_i - \overline{X})^2}{n-1} = \frac{\sum x^2 - n\left(\overline{X}\right)^2}{n-1}$

Locating Percentiles: $P\alpha$

$$R\alpha = \frac{\alpha}{100}(n+1) = i.d$$

$$P\alpha = X_{(i)} + d\left(X_{(i+1)} - X_{(i)}\right)$$

Coefficient of variation: $v = s/\overline{X}$

Coefficient of skew ness: $SK = \frac{3(\overline{X} - m)}{s}$

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

$$\mathrm{P}(\mathrm{A} \cup \mathrm{B}) = P(A) + P(B) - P(A \cap B)$$

$$P(A|B) = \frac{P(A \cap B)}{\mathrm{P}(\mathrm{B})}$$

$$\mathrm{P}(\mathrm{A}_1 \cap A_2 \cdots \mathrm{A}_{k-1} \cap A_k) = P(A_1)\, P(A_2|A_1) P(A_3|A_1 \cap A_2) \cdots \mathrm{P}(\mathrm{A}_k|\mathrm{A}_1 \cap A_2 \cdots \mathrm{A}_{k-1})$$

Total Rule of Probability: $P(A) = \sum_{i=1}^{k} P(A|B_i) P(B_i)$

Bayes' Rule: $P(A|B_r) = \frac{P(A|B_r)P(B_r)}{P(A)} = \frac{P(A|B_r)P(B_r)}{\sum_{i=1}^{k} P(A|B_i)P(B_i)}$

$$E(X) = \sum x f(x) \text{ or } \int_{-\infty}^{\infty} x f(x) dx$$

$$\sigma^2 = \sum [x-\mu]^2 f(x) \text{ or } \int_{-\infty}^{\infty} [x-\mu]^2 f(x) dx$$

$$\sigma^2 = E(x^2) - [E(x)]^2$$

$$\mu_{g(x)} = E[g(x)] = \sum g(x) f(x) \text{ or } \int_{-\infty}^{\infty} g(x) f(x) dx$$

$$\sigma^2_{g(x)} = E[g(x) - \mu_{g(x)}]^2$$