Cheatlist for the Midterm examination # 1

Chapter 4

Number of combinations:

$$C_k^n = \frac{n!}{k!(n-k)!}$$

where $n! = 1 * 2 * 3 * ... * n$

Probability rules:

$$P(\bar{A}) = 1 - P(A)$$

$$P(A \cup B) = P(A) + P(B) \; if \; A \; and \; B \; are \; mutually \; exclusive$$

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

$$P(A|B) = P(A \cap B)/P(B), if P(B) > 0$$

Bayes' Theorem

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

Chapter 5

Cdf: $F(x_0) = P(X \leq x_0)$

Expected value: $E(X) = \mu_X = \sum_x xp(x)$

Variance: $Var(X) = \sigma^2 = \sum_x (x - \mu_X)^2 p(x) = \sum_x x^2 p(x) - \mu_X^2$

Binomial distribution (n - number trials, x -number successes, p -probability of success)

$$P(x) = C_x^n p^x (1-p)^{(n-x)}$$

Binomial distribution has mean np and variance $np(1-p)$

Poisson distribution:

$$P(x) = \frac{e^{-\lambda}\lambda^x}{x!}$$

Poisson distribution has mean λ and variance λ

Chapter 6

Uniform distribution:

$$f(x) = \begin{cases} \frac{1}{b-a} & if \; a \leq x \leq b \\ 0 & else \end{cases}$$

Uniform distribution has mean $(a+b)/2$ and variance $(b-a)^2/12$

Normal Distribution

$$f(x) = \frac{1}{\sqrt{2\pi\sigma^2}} e^{-(x-\mu)^2/2\sigma^2}$$

Normal distribution has mean μ and variance σ^2