Equation Sheet of Exam #1

1. $P[A \mid B] = \dfrac{P[AB]}{P[B]}$

2. $P[A \mid B]P[B] = P[B \mid A]P[A]$

3. $P[A] = \sum_{i=1}^{N} P[A \mid B_i]P[B_i]$

4. $(n)_k = \dfrac{n!}{(n-k)!}$

5. $\binom{n}{k} = \dfrac{n!}{(n-k)!k!}$

If X is Bernoulli(p),

$$P_X(x) = \begin{cases} 1-p & , \ x = 0 \\ \text{p} & , \ \text{x} = 1 \\ 0, & \text{otherwise} \end{cases}$$

If X is Geometric(p),

$$P_X(x) = \begin{cases} p(1-p)^{x-1} & , \quad x = 1,2,\dots \\ 0 & , \quad otherwise \end{cases}$$

If X is Binomial (n,p)

$$P_X(x) = \begin{cases} \binom{n}{x} p^x (1-p)^{(n-x)}, & x = 0,1,2,\dots,n \\ 0 & , \quad otherwise \end{cases}$$

If X is Pascal (k,p)

$$P_X(x) = \begin{cases} \binom{x-1}{k-1} p^k (1-p)^{(x-k)}, & x = k, k+1, \dots \\ 0 & , \quad otherwise \end{cases}$$

If X is Poisson(α),

$$P_X(x) = \begin{cases} \frac{\alpha^x e^{-\alpha}}{x!} & , \quad x = 0,1,2,\dots \\ 0 & , \quad otherwise \end{cases}$$