

Frequently Used Formulas - II

* Permutation Formulas:

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

Combination:

$${}^n C_r = \frac{n!}{(n-r)! \cdot r!}$$

* Mean:

$$\text{Expectation} = \text{Mean} = u = \sum_{i=1}^k x_i \cdot p(x_i)$$

$$\text{Variance} = \sigma^2 = \sum_{i=1}^k x_i^2 \cdot p(x_i) - u^2$$

* Binomial distribution: $p+q=1$

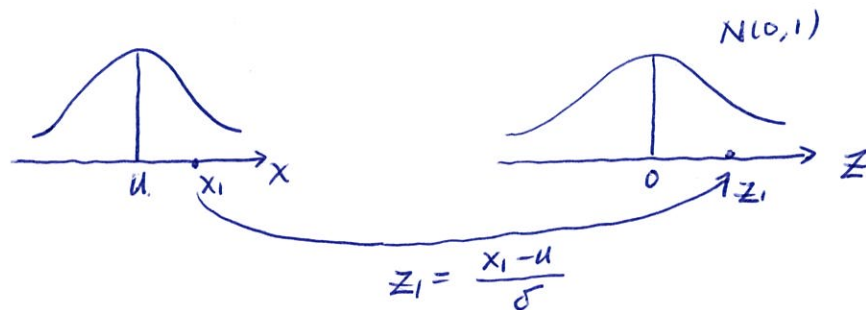
$$\begin{aligned} p(X=x) &= {}^n C_x \cdot p^x \cdot (1-p)^{n-x} \\ &= \frac{n!}{(n-x)! \cdot x!} \cdot p^x \cdot (1-p)^{n-x} \end{aligned}$$

$$\text{Mean} = u = n \cdot p$$

$$\text{Variance} = \sigma^2 = n \cdot p \cdot q$$

* Normal distribution transformation.

$$Z = \frac{X-u}{\sigma}$$



* Central Limit Theorem:

$$\bar{Z} = \frac{\bar{X}_n - u}{\sigma/\sqrt{n}}$$