- $\bar{X} = \frac{\sum x}{n}, S^2 = \frac{\sum (x - \bar{X})^2}{n-1} = \frac{\sum x^2 - \frac{1}{n}(\sum x)^2}{n-1}$
- $E(X) = \sum x f(x)$ or $\int_{-\infty}^{\infty} x f(x) dx$
- $\sigma^2 = \sum [x - \mu]^2 f(x)$ or $\int_{-\infty}^{\infty} [x - \mu]^2 f(x) dx$

$$\sigma^2 = E(X^2) - E^2(X) = E(X^2) - \mu^2$$

. $f(x) = \lambda e^{-\lambda x}, \quad x > 0$

. $\mu = \frac{1}{\lambda}, \ \sigma^2 = \frac{1}{\lambda^2}$

- $\mu_{\bar{X}} = \mu, \ \sigma_{\bar{X}} = \frac{\sigma}{\sqrt{n}}$

$$z = \frac{\bar{x} - \mu}{\sigma / \sqrt{n}}$$