$$\mathrm{Var}(X) \overset{\text{def}}{=} \begin{cases} E\left\{[X - E(X)]^2\right\} \\ E\left\{[X - \mu_X]^2\right\}, \text{ where } \mu_X = E(X) \end{cases}$$

$$\overset{\text{comp}}{=} E(X^2) - [E(X)]^2$$

$$E[g(X)] = \sum_{x=0}^{\infty} g(x)\, P(X = x)$$

$$E[X(X-1)] = E[X^2 - X] = E(X^2) - E(X)$$