4) For discreate Random variable

$\mu = \sum x P(x)$ where $p(x)$ is the PMF

$$\sigma^2 = \sum (x-\mu)^2 p(x)$$

$$= \sum (x^2 - 2x\mu + \mu^2) p(x)$$

$$= \sum (x^2) p(x) - 2\mu \sum x p(x) + \mu^2 \sum p(x)$$

$$= E(x^2) - 2\mu x \mu + \mu^2$$

$$= E(x^2) - \mu^2 \Rightarrow E(x^2) - (E(x))^2$$