

$$\begin{aligned} E(X^2) &= \sum x^2 f(x) \\ &= 1^2 \cdot \frac{1}{10} + 2^2 \cdot \frac{2}{10} + 3^2 \cdot \frac{3}{10} + 4^2 \cdot \frac{4}{10} \\ &= \frac{1 + 8 + 27 + 64}{10} = 10 \end{aligned}$$

$$E\{(X-3)^2\} = \sum_x (x-3)^2 f(x)$$

$$= (1-3)^2 \cdot \frac{1}{10} + (2-3)^2 \cdot \frac{2}{10}$$

$$+ (3-3)^2 \cdot \frac{3}{10} + (4-3)^2 \cdot \frac{4}{10}$$

$$= \frac{4 + 2 + 0 + 4}{10} = 1$$