

$$\begin{aligned}
 \text{(iii)} \quad E(\bar{X}) &= \overset{\curvearrowright}{E\left(\frac{1}{n}(X_1 + \cdots + X_n)\right)} \\
 &= \frac{1}{n}E(X_1 + \cdots + X_n) \\
 &= \text{by (i)} \\
 &= \frac{1}{n}(n\mu_X) \\
 &= \mu_X
 \end{aligned}$$

$$\begin{aligned}
 \text{(iv)} \quad V(\bar{X}) &= \overset{\curvearrowright}{V\left(\frac{1}{n}(X_1 + \cdots + X_n)\right)} \\
 &\text{by the Prop.} \\
 &= \frac{1}{n^2}V(X_1 + \cdots + X_n) \\
 &\text{by (ii)} \\
 &= \frac{1}{n^2}(n\sigma_X^2) \\
 &= \frac{\sigma_X^2}{n}
 \end{aligned}$$