(iii) $$E(\overline{X}) = E\left(\frac{1}{n}(X_1 + \cdots + X_n)\right)$$

$$= \frac{1}{n}E(X_1 + \cdots + X_n)$$

$$= \text{by (i)}$$

$$= \frac{1}{n}(n\mu_X)$$

$$= \mu_X$$

(iv) $$V(\overline{X}) = V\left(\frac{1}{n}(X_1 + \cdots + X_n)\right)$$

$$\text{by the Prop.}$$

$$= \frac{1}{n^2}V(X_1 + \cdots + X_n)$$

$$\text{by (ii)}$$

$$= \frac{1}{n^2}(n\sigma_X^2)$$

$$= \frac{\sigma_X^2}{n}$$