5a) $\bar{X}_a = \sum_{i=1}^{n} a_i X_i$

$$\sum_{i=1}^{n} E(a_i X_i) = \sum_{i=1}^{n} a_i E(X_i)$$

$$= n(a E(X)) = \mu$$

$$\Rightarrow n a \mu = \mu$$

$$\Rightarrow a = \frac{1}{n}$$

b) $Var(\bar{X}_a) = Var\left(\sum_{i=1}^{n} a_i X_i\right)$

$$= \frac{1}{n^2} \sum_{i=1}^{n} Var(X_i)$$

$$= Var(naX)$$

$$= n^2 Var(aX)$$

$$= n^2 a^2 Var(X)$$

$$= n^2 a^2 = 1$$

$$a^2 = \frac{1}{n^2}$$

$$a = \frac{1}{n}$$