

93. Let  $X_1, X_2, \dots, X_n$  be a random sample from a population with mean  $\mu$  and variance  $\sigma^2 < \infty$ . Prove

(a)  $\text{Var}(\bar{X}) = \sigma^2/n$  and

(b)  $E[S^2] = \sigma^2$