

**9.17** Suppose that  $X_1, X_2, \dots, X_n$  and  $Y_1, Y_2, \dots, Y_n$  are independent random samples from populations with means  $\mu_1$  and  $\mu_2$  and variances  $\sigma_1^2$  and  $\sigma_2^2$ , respectively. Show that  $\bar{X} - \bar{Y}$  is a consistent estimator of  $\mu_1 - \mu_2$ .

**9.18** In Exercise 9.17, suppose that the populations are normally distributed with  $\sigma_1^2 = \sigma_2^2 = \sigma^2$ . Show that

$$\frac{\sum_{i=1}^n (X_i - \bar{X})^2 + \sum_{i=1}^n (Y_i - \bar{Y})^2}{2n - 2}$$

is a consistent estimator of  $\sigma^2$ .