12.8: Formula Review

12.2 Test of Two Variances

$$H_0 : \frac{\sigma_1^2}{\sigma_2^2} = \delta_0$$

$$H_a : \frac{\sigma_1^2}{\sigma_2^2} \neq \delta_0$$

if $\delta_0 = 1$ then

$$H_0 : \sigma_1^2 = \sigma_2^2$$

$$H_a : \sigma_1^2 \neq \sigma_2$$

Test statistic is :

$$F_c = \frac{S_1^2}{S_2^2}$$

12.3 The F Distribution and the F-Ratio

$$SS_{\text{between}} = \sum \left[\frac{(s_j)^2}{n_j} \right] - \frac{\left(\sum s_j\right)^2}{n}$$

$$SS_{\text{total}} = \sum x^2 - \frac{\left(\sum x\right)^2}{n}$$

$$SS_{\text{within}} = SS_{\text{total}} - SS_{\text{between}}$$

$$df_{\text{between}} = df(\text{ num }) = k - 1$$

$$df_{\text{within}} = df(\text{ denom }) = n - k$$

$$MS_{\text{between}} = \frac{SS_{\text{between}}}{df_{\text{between}}}$$

$$MS_{\text{within}} = \frac{SS_{\text{within}}}{df_{\text{within}}}$$

$$F = \frac{MS_{\text{between}}}{MS_{\text{within}}}$$

$k =$ the number of groups
$n_j =$ the size of the j^{th} group
$s_j =$ the sum of the values in the j^{th} group
$n =$ the total number of all values (observations) combined
$x =$ one value (one observation) from the data
$s_{\bar{x}}{}^2 =$ the variance of the sample means
$s^2{}_{\text{pooled}} =$ the mean of the sample variances (pooled variance)