$$SST = \sum_{i=1}^{p}\sum_{j=1}^{n_i}(\bar{y}_i - \bar{y})^2$$

$$SSE = \sum_{i=1}^{p}\sum_{j=1}^{n_i}(y_{ij} - \bar{y}_i)^2$$

$$TSS = \sum_{i=1}^{p}\sum_{j=1}^{n_i}(y_{ij} - \bar{y})^2$$

$$SS_{xx} = \sum_{i=1}^{n}(x_i - \bar{x})^2 \qquad SS_{yy} = \sum_{i=1}^{n}(y_i - \bar{y})^2$$

$$SS_{xy} = \sum_{i=1}^{n}[(x_i - \bar{x})(y_i - \bar{y})]$$

$$\hat{\beta}_1 = \frac{SS_{xy}}{SS_{xx}}$$

$$\hat{\beta}_0 = \bar{y} - \hat{\beta}_1\bar{x}$$

$$SSE = \sum_{i=1}^{n}(y_i - (\hat{\beta}_0 + \hat{\beta}_1 x_i))^2$$

$$TSS = \sum_{i=1}^{n}(y_i - \bar{y})^2$$

$$\hat{\sigma}_{\hat{\beta}_1} = \frac{\sqrt{MSE}}{\sqrt{SS_{xx}}} \text{ use with } t_{(df=n-2)}$$

$$\hat{\sigma}_{\hat{y}} = \sqrt{MSE}\sqrt{\frac{1}{n} + \frac{(x - \bar{x})^2}{SS_{xx}}} \text{ use with } t_{(df=n-2)}$$

$$\hat{\sigma}_{(y-\hat{y})} = \sqrt{MSE}\sqrt{1 + \frac{1}{n} + \frac{(x - \bar{x})^2}{SS_{xx}}} \text{ use with } t_{(df=n-2)}$$

$$r = \frac{SS_{xy}}{\sqrt{SS_{xx}SS_{yy}}}$$

$$r^2 = \frac{SSR}{TSS}$$

$$\frac{MSR}{MSE} = \frac{(n-2)r^2}{(1-r^2)}$$