Formulas

Significance Test and Confidence Interval for One Population
$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i, \quad s^2 = \frac{1}{n-1}\left[\sum_{i=1}^{n} x_i^2 - n\bar{x}^2\right], \quad s = \sqrt{s^2}.$
z-test: $z = \frac{\bar{x}-\mu_0}{\sigma/\sqrt{n}}$,
$(1-\alpha)100\%$ C.I. for μ: $\bar{x} \pm z_{\alpha/2}\frac{\sigma}{\sqrt{n}}$,
t-test: $t = \frac{\bar{x}-\mu_0}{s/\sqrt{n}}$,
$(1-\alpha)100\%$ C.I. for μ: $\bar{x} \pm t_{\alpha/2,n-1}\frac{s}{\sqrt{n}}$.

Chi-Square Test
$X^2 = \sum_{i=1}^{k} \frac{(n_i - np_i)^2}{np_i}$ which obeys a χ^2-distribution with $k-1$ d.f.

Regression and Correlation
$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i, \quad \bar{y} = \frac{1}{n}\sum_{i=1}^{n} y_i,$
$S_{xx} = \sum_{i=1}^{n} x_i^2 - n\bar{x}^2,$
$S_{xy} = \sum_{i=1}^{n} x_i y_i - n\bar{x}\bar{y},$
$S_{yy} = \sum_{i=1}^{n} y_i^2 - n\bar{y}^2,$
$\hat{a}_1 = \frac{S_{xy}}{S_{xx}}, \quad \hat{a}_0 = \bar{y} - \hat{a}_1\bar{x}.$
The least squares linear regression equation: $\hat{y} = \hat{a}_0 + \hat{a}_1 x$.
The correlation coefficient: $r = \frac{S_{xy}}{\sqrt{S_{xx}S_{yy}}}$.
The correlation is significantly different from zero at the α level of significance if

$$|r|\sqrt{\frac{n-2}{1-r^2}} \geq t_{\alpha/2,n-2}.$$

CRD
$T_i = \sum_{j=1}^{n} x_{ij}, \quad \bar{x}_i = \frac{T_i}{n}, \quad T = \sum_{i=1}^{c} T_i,$
$SS_{total} = \sum_{i=1}^{c}\sum_{j=1}^{n} x_{ij}^2 - \frac{T^2}{cn},$
$SS_{treat} = \frac{1}{n}\sum_{i=1}^{c} T_i^2 - \frac{T^2}{cn},$
$SS_{error} = SS_{total} - SS_{treat},$
$MS_{treat} = \frac{SS_{treat}}{c-1}, \quad MS_{error} = \frac{SS_{error}}{c(n-1)},$
$F = \frac{MS_{treat}}{MS_{error}}.$
$s = \sqrt{MS_{error}}.$
$(1-\alpha)100\%$ C.I. for μ_i: $\bar{x}_i \pm t_{\alpha/2,c(n-1)} s\sqrt{\frac{1}{n}}$.
$(1-\alpha)100\%$ C.I. $\mu_i - \mu_j$: $\bar{x}_i - \bar{x}_j \pm t_{\alpha/2,c(n-1)} s\sqrt{\frac{2}{n}}$.

RBD

$B_i = \sum_{j=1}^{c} x_{ij}, \quad \bar{B}_i = \frac{B_i}{c}, \quad T_j = \sum_{i=1}^{r} x_{ij}, \quad \bar{x}_j = \frac{T_j}{r},$

$G = \sum_{i=1}^{c} T_i, \quad \bar{G} = \frac{G}{rc},$

$SS_{total} = \sum_{i=1}^{r} \sum_{j=1}^{c} x_{ij}^2 - \frac{G^2}{rc},$

$SS_{treat} = \frac{1}{r} \sum_{j=1}^{c} T_j^2 - \frac{G^2}{rc},$

$SS_{block} = \frac{1}{c} \sum_{i=1}^{r} B_i^2 - \frac{G^2}{rc},$

$SS_{error} = SS_{total} - SS_{treat} - SS_{block},$

$MS_{treat} = \frac{SS_{treat}}{c-1}, \quad MS_{block} = \frac{SS_{block}}{r-1}, \quad MS_{error} = \frac{SS_{error}}{(r-1)(c-1)}, \quad s = \sqrt{MS_{error}}.$

F-test for treatments: $F = \frac{MS_{treat}}{MS_{error}} > F_{\alpha,c-1,(r-1)(c-1)}$.

F-test for blocks: $F = \frac{MS_{block}}{MS_{error}} > F_{\alpha,r-1,(r-1)(c-1)}$.

$(1-\alpha)100\%$ C.I. for μ_j: $\bar{T}_j \pm t_{\alpha/2,(r-1)(c-1)} s\sqrt{\frac{1}{r}}$.

$(1-\alpha)100\%$ C.I. for $\mu_j - \mu_k$: $\bar{T}_j - \bar{T}_k \pm t_{\alpha/2,(r-1)(c-1)} s\sqrt{\frac{2}{r}}$.