Formula Sheet for BCS-306

$z = \frac{1}{2}\left\{\ln\left(\frac{1+r}{1-r}\right) - \ln\left(\frac{1+\rho}{1-\rho}\right)\right\}$; $z = r_s(\sqrt{n-1})$; $r = \frac{n\sum xy \;\; \sum x \sum y}{\sqrt{n\sum x^2 - (\sum x)^2}\sqrt{n\sum y^2 - (\sum y)^2}}$ $\hat{a} = \bar{y} - b\bar{x}$; $\hat{b} = \frac{n\sum xy - \sum x \sum y}{n\sum x^2 - (\sum x)^2}$; $t = \frac{(\bar{x}-\mu)}{s/\sqrt{n}}$; df= $v = n - 1$

$z = \frac{(\bar{x}-\mu)}{\sigma/\sqrt{n}}$; $S.E = \sigma/\sqrt{n}$; $t = \frac{(\overline{x_1} - \bar{x}_2) - d_0}{S_p\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$ with df = $v = (n_1 + n_2 - 2)$

$S_p = \sqrt{\frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{(n_1+n_2-2)}}$; $t = \frac{(\overline{x_1} - \bar{x}_2) - d_0}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$; $v = \frac{\left(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}\right)^2}{\frac{\left(\frac{s_1^2}{n_1}\right)^2}{n_1 - 1} + \frac{\left(\frac{s_2^2}{n_2}\right)^2}{n_2 - 1}}$; t= $\frac{\bar{d} - \mu_D}{s_d/\sqrt{n}}$

$z = \frac{(\overline{x_1} - \bar{x}_2) - d_0}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$; $e_i = y - \hat{y}$; $z = \frac{(\hat{p} - P)}{\sqrt{\frac{\hat{p}\hat{q}}{n}}}$; $z = \frac{(\hat{p}_1 - \hat{p}_2) - (P_1 - P_2)}{\sqrt{(\frac{\hat{p}_1\hat{q}_1}{n1} + \frac{\hat{p}_2\hat{q}_2}{n2}}}$; $\chi^2 = \frac{(n-1)s^2}{\sigma^2}$

$P(X = x) = C_x^n \, p^x q^{n-x}$; $x = 0,1, \dots\dots n$; $P(X = x) = \frac{e^{-\mu}\mu^x}{x!}$; $x = 0,1, \dots\dots \infty$

$E(f) = \sum f.P(x)$ $\quad$ $E(x \pm a) = E(x) \pm a$ $\quad$ $E(C\,x) = C.\,E(x)$

$z = \frac{(x-\mu)}{\sigma}$ $\quad$ $E(xy) = \sum\sum xy.P(x,y)$ $\quad$ $\sum P(x) = 1$

$P(x \geq a) = 1 - P(x < a)$ $\quad$ $P(x > a) = 1 - P(x \leq a)$

$P(x = a) = P(x \leq a) - P(x < a)$ $\quad$ $P(a \leq x \leq b) = P(x \leq b) - P(x < a)$

$P(a < x < b) = P(x < b) - P(x \leq a)$

$\bar{x} \pm Z_{\alpha/2}\, \sigma/\sqrt{n}$; $\bar{x} \pm t_{\alpha/2}\, s/\sqrt{n}$; df = $v = n - 1$; $(\bar{x}_1 - \bar{x}_2) \pm Z_{\alpha/2}\sqrt{\left(\frac{\sigma_1^2}{n_1} + \frac{\sigma_1^2}{n_2}\right)}$

$(\bar{x}_1 - \bar{x}_2) \pm t_{\alpha/2}\sqrt{\left(\frac{s_1^2}{n_1} + \frac{s_1^2}{n_2}\right)}$; With $v = \frac{\left(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}\right)^2}{\frac{\left(\frac{s_1^2}{n_1}\right)^2}{n_1 - 1} + \frac{\left(\frac{s_2^2}{n_2}\right)^2}{n_2 - 1}}$

$(\bar{x}_1 - \bar{x}_2) \pm t_{\alpha/2} S_p\sqrt{\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}$; With $v = n_1 + n_2 - 2$

$\hat{p} \pm Z_{\alpha/2}\sqrt{\frac{\hat{p}\hat{q}}{n}}$; $(\hat{p}_1 - \hat{p}_2) \pm Z_{\alpha/2}\sqrt{\left(\frac{\widehat{p_1}\widehat{q_1}}{n_1} + \frac{\widehat{p_2}\widehat{q_2}}{n_2}\right)}$; $\frac{(n-1)s^2}{\chi^2_{\frac{\alpha}{2}}} \leq \sigma^2 \leq \frac{(n-1)s^2}{\chi^2_{1-\frac{\alpha}{2}}}$

SST = SSTr + SSE; $SST = \sum\sum y_{ij}^2 - CF$ $\quad$ $SSTr = \frac{\sum T_i^2}{n_i} - CF$ $CF = \frac{G^2}{N}$

SSE = SST – SSTr

$P(x \leq a) = \int_{-\infty}^{a} f(x)dx$; $P(a \leq x \leq b) = \int_a^b f(x)dx$