$$P(A \cup B) = P(A) + P(B) - P(A \cap B) \qquad P(A|B) = P(A \cap B)/P(B) \quad = \quad P(B|A)P(A)/P(B)$$

$$P(B) = P(B \cap A_1) + ... + P(B \cap A_n) = P(B|A_1)P(A_1) + ... + P(B|A_n)P(A_n)$$

$$P(X = k) = \binom{n}{k} p^k (1-p)^{n-k} \qquad E(X) = \sum x \; p(x)$$

$$\bar{x} = \sum x_i/n, \quad s^2 = \sum (x_i - \bar{x})^2/(n-1), \quad \bar{x} \pm z_{\alpha/2}\frac{\sigma}{\sqrt{n}}, \quad n = \left(\sigma z_{\alpha/2}/E\right)^2$$

$$z_s = \frac{x - \mu}{\sigma} = \frac{\bar{x} - \mu}{\sigma/\sqrt{n}}, \quad n = \left(\sigma(z_\alpha + z_\beta)/\Delta\right)^2,$$

$$\bar{x} \pm t_{\alpha/2}\frac{s}{\sqrt{n}}, \quad n = \left(\frac{z_{\alpha/2}}{E}\right)^2 \hat{\sigma}^2, \quad t_s = \frac{\bar{x} - \mu_0}{s/\sqrt{n}}$$

$$(\bar{x}_1 - \bar{x}_2) \pm t_{\alpha/2} SE_{\bar{x}_1 - \bar{x}_2}, \quad n = \left(\frac{z_{\alpha/2}}{E}\right)^2 (\hat{\sigma}_1^2 + \hat{\sigma}_2^2), \quad t_s = \frac{(\bar{x}_1 - \bar{x}_2) - D_0}{SE_{\bar{x}_1 - \bar{x}_2}}, \quad n = \frac{(z_\alpha + z_\beta)^2(\hat{\sigma}_1^2 + \hat{\sigma}_2^2)}{\Delta^2}$$

$$SE_{\bar{x}_1 - \bar{x}_2} = \sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}} \quad or \quad \sqrt{s_p^2\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}, \quad s_p^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}, \quad F_{\max,s} = s_{\max}^2/s_{\min}^2$$

$$S_{wmw} = \text{Sum of ranks in sample 1}, \; z_s = \frac{S_{wmw} - \mu_{S_{wmw}}}{\sigma_{S_{wmw}}}, \; \mu_{S_{wmw}} = \frac{n_1(n_1 + n_2 + 1)}{2}, \; \sigma_{S_{wmw}}^2 = \frac{n_1 n_2}{12}(n_1 + n_2 + 1)$$

$$\bar{d} \pm t_{\alpha/2}\frac{s_d}{\sqrt{n}}, \quad n = \left(\frac{z_{\alpha/2}\; \hat{\sigma}_d}{E}\right)^2$$

$$t_s = \frac{\bar{d} - 0}{s_d/\sqrt{n}} \quad where \quad d_i = x_{i1} - x_{i2}, \quad n = \frac{(z_\alpha + z_\beta)^2 \hat{\sigma}_d^2}{\Delta^2}$$

$$V_{wsr} = min(V_+, V_-), \; V_+ = \text{Sum of pos. ranks}, \; z_s = \frac{V_{wsr} - \mu_{V_{wsr}}}{\sigma_{V_{wsr}}}, \; \mu_{V_{wsr}} = \frac{n^*(n^* + 1)}{4}, \; \sigma_{V_{wsr}}^2 = \frac{n^*(n^* + 1)(2n^* + 1)}{24}$$

$$\hat{p} \pm z_{\alpha/2}\sqrt{\frac{\hat{p}(1 - \hat{p})}{n}}, \quad n = \left(\frac{z_{\alpha/2}}{E}\right)^2 p^*(1 - p^*), \quad z_s = \frac{\hat{p} - p_o}{\sqrt{\frac{p_o(1 - p_o)}{n}}}$$

$$X_s^2 = \sum_i \sum_j \frac{(O_{ij} - E_{ij})^2}{E_{ij}}, \quad E_{ij} = \frac{(row_i \; total)(col_j \; total)}{Grand \; Total}$$

$$\hat{OR} = \frac{Odds(E|group1)}{Odds(E|group2)} = \frac{\hat{p}_1/(1 - \hat{p}_1)}{\hat{p}_2/(1 - \hat{p}_2)} = \frac{ad}{bc}, \quad SE[\ln(\hat{OR})] = \sqrt{1/a + 1/b + 1/c + 1/d}$$

$$SStotal = \sum_{i=1}^{t} \sum_{j=1}^{n_i} \left(Y_{ij} - \bar{Y}_{\cdot\cdot}\right)^2, \quad SStrt = \sum_{i=1}^{t} \sum_{j=1}^{n_i} \left(\bar{Y}_{i\cdot} - \bar{Y}_{\cdot\cdot}\right)^2, \quad SSe = \sum_{i=1}^{t} \sum_{j=1}^{n_i} \left(Y_{ij} - \bar{Y}_{i\cdot}\right)^2$$

$$F_s = MStrt/MSe, \quad \bar{Y}_{i\cdot} \pm t_{\alpha/2}\sqrt{\frac{s_p^2}{n_i}}$$
