FORMULAS

$$\mu = E(X) = \sum_{i=1}^{N} x_i p(x_i)$$

$$\sigma^2 = \sum_{i=1}^{N} [(x_i - \mu)^2] p(x_i)$$

$$\sigma = \sqrt{\sigma^2} = \sqrt{\sum_{i=1}^{N} (x_i - \mu)^2 p(x_i)}$$

$$P(x) = \frac{n!}{x!(n-x)!}\pi^x (1-\pi)^{n-x}$$

$$nC_x p^x (1-p)^{n-x}$$

$$\mu = E(X) = n\pi$$

$$\sigma = \sqrt{\sigma^2} = \sqrt{Var(X)} = \sqrt{n\pi(1-\pi)}$$

$$P(x) = \frac{\lambda^x \cdot e^{-\lambda}}{x!}$$

$$x = 0,\ 1,\ 2,\ \ldots$$

$$Z = \frac{X - \mu}{\sigma}$$

$$\mu_{\bar{x}} = E(\bar{x}) = \mu$$

$$\sigma_{\bar{x}} = \frac{\sigma}{\sqrt{n}} \quad \text{Std. Error of the Mean}$$

$$z = \frac{\bar{x} - \mu}{\sigma / \sqrt{n}}$$

$$p = \frac{X}{n}$$

$$\sigma_p = \sqrt{\frac{p(1-p)}{n}}$$

$$Z = \frac{\overline{X} - \mu_{\overline{X}}}{\sigma_{\overline{X}}} = \frac{\overline{X} - \mu}{\sigma / \sqrt{n}}$$

$$t = \frac{\overline{X} - \mu}{S / \sqrt{n}}$$

$$t=\frac{\left(\bar{X}_1-\bar{X}_2\right)-\left(\mu_1-\mu_2\right)}{\sqrt{S_p^2\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}} \qquad S_p^2=\frac{\left(n_1-1\right)S_1^2+\left(n_2-1\right)S_2^2}{\left(n_1-1\right)+\left(n_2-1\right)}$$

$$Z=\frac{(\bar{X}_1-\bar{X}_2)-(\mu_1-\mu_2)}{\sqrt{\frac{\sigma_1{}^2}{n_1}+\frac{\sigma_2{}^2}{n_2}}}$$

$$t=\frac{\bar{d}-\mu_d}{s_d/\sqrt{n}} \quad \bar{d}=\frac{\sum_{i=1}^{n}d_i}{n} \quad s_d=\sqrt{\frac{\sum_{i=1}^{n}\left(d_i-\bar{d}\right)^2}{n-1}}$$

$$CI=\bar{x}\pm\left[t_{\alpha/2;n-1}\times\frac{s}{\sqrt{n}}\right]$$

$$z=\frac{(\hat{p}_1-\hat{p}_2)-(p_1-p_2)}{\sqrt{\hat{p}(\hat{q})\left[\frac{1}{n_1}+\frac{1}{n_2}\right]}} \qquad \hat{p}=\frac{n_1\hat{p}_1+n_2\hat{p}_2}{n_1+n_2}=\frac{x_1+x_2}{n_1+n_2}$$

$$CI=\bar{x}\pm\left[Z_{\alpha/2}\times\frac{\sigma}{\sqrt{n}}\right]$$

$$CI=(\bar{x}_1-\bar{x}_2)\pm t_{\alpha/2,(n_1+n_2-2)}\times s_p\sqrt{\frac{1}{n_1}+\frac{1}{n_2}}$$

Pooled standard deviation $\left(s_p\right)=\sqrt{\frac{(n_1-1)s_1^2+(n_2-1)s_2^2}{n_1+n_2-2}}$

$$\bar{d}\pm t_{\alpha/2,n-1}\times\frac{s_d}{\sqrt{n}}$$

$$CI=\hat{p}\pm\left[Z_{\alpha/2}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}\right],1-\hat{p}=\hat{q}$$

$$CI = \hat{p}_1 - \hat{p}_2 \pm Z_{\alpha/2}\sqrt{\frac{\hat{p}_1(\hat{q}_1)}{n_1} + \frac{\hat{p}_2(\hat{q}_2)}{n_2}}$$

$$\chi^2 = \sum_{\text{All Cells}} \frac{(f_0 - f_e)^2}{f_e}$$

$$r = \frac{n\sum xy - \sum x \sum y}{\sqrt{[n(\sum x^2) - (\sum x)^2][n(\sum y^2) - (\sum y)^2]}}$$

$$t_{calc} = \frac{r}{\sqrt{\frac{1-r^2}{n-2}}}$$

$$b_1 = \frac{\sum xy - \frac{\sum x \sum y}{n}}{\sum x^2 - \frac{(\sum x)^2}{n}}$$

$$b_0 = \bar{y} - b_1\bar{x} \quad \text{where } \bar{y} = \frac{\sum Y}{n} \qquad \bar{x} = \frac{\sum X}{n}$$

$$b_1 \pm t_{\alpha/2} s_{b_1}$$

$$b_1 \pm t_{\alpha/2, n-2} \frac{s_\varepsilon}{\sqrt{\sum (x - \bar{x})^2}}$$