EQUATIONS

$\bar{x} = \frac{1}{n}\sum_{i=1}^{n} x_i$	$s^2 = \frac{\sum_{i=1}^{n}(x_i - \bar{x})^2}{n-1} = \frac{\sum_{i=1}^{n} x_i^2 - n\bar{x}^2}{n-1}$	$z = \frac{x-\mu}{\sigma_x}$
$s^2 = \frac{1}{n-1}\left[\sum_{i=1}^{n} x_i^2 - \frac{1}{n}\left(\sum_{i=1}^{n} x_i\right)^2\right]$	$x_p = \mu + \sigma_x z_p$	$\sigma_x^2 = \frac{1}{N}\sum_{i=1}^{N}(x_i - \mu)^2$
$P(\|X-\mu\| \leq k\sigma) \geq 1 - \frac{1}{k^2}$	$\sigma_{\bar{x}}^2 = \frac{\sigma_x^2}{n}\left(1 - \frac{n-1}{N-1}\right)$	$\sigma_p^2 = \frac{\pi(1-\pi)}{n}\left(1 - \frac{n-1}{N-1}\right)$
$\sigma_{\bar{x}}^2 = \frac{\sigma_x^2}{n}$	$\sigma_p^2 = \frac{\pi(1-\pi)}{n}$	$n = \frac{z_{1-\alpha/2}^2 \sigma_x^2}{m^2}$
$n = \frac{z_{1-\alpha/2}^2 \pi(1-\pi)}{m^2}$	$\bar{x} \pm z_{1-\alpha/2}\frac{\sigma_x}{\sqrt{n}}$	$p \pm z_{1-\alpha/2}\frac{\sqrt{p(1-p)}}{\sqrt{n}}$
$\bar{x} \pm t_{1-\alpha/2,n-1}\frac{s}{\sqrt{n}}$	$z = \frac{\bar{x}-\mu_0}{\sigma_x/\sqrt{n}}$	$z = \frac{p-\pi_0}{\sqrt{\pi_0(1-\pi_0)/n}}$
$t = \frac{\bar{x}-\mu_0}{s/\sqrt{n}}$	$\sigma_{p_1-p_2}^2 = \frac{\pi_1(1-\pi_1)}{n_1} + \frac{\pi_2(1-\pi_2)}{n_2}$	$p_1 - p_2 \pm z_{1-\alpha/2}\sqrt{\frac{p_1(1-p_1)}{n_1} + \frac{p_2(1-p_2)}{n_2}}$
$\sigma_{\bar{x}_1-\bar{x}_2}^2 = \frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}$	$\bar{x}_1 - \bar{x}_2 \pm t_{1-\alpha/2,df}\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$	$t = \frac{\bar{x}_1-\bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$
$df = \frac{(V_1+V_2)^2}{\frac{V_1^2}{n_1-1} + \frac{V_2^2}{n_2-1}}$	$V_1 = \frac{s_1^2}{n_1}$	$V_2 = \frac{s_2^2}{n_2}$
$z = \frac{\bar{x}_1-\bar{x}_2}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$	$z = \frac{p_1-p_2}{\sqrt{\frac{p_c(1-p_c)}{n_1} + \frac{p_c(1-p_c)}{n_2}}}$	$p_c = \frac{n_1 p_1 + n_2 p_2}{n_1 + n_2}$
$t = \frac{\bar{x}_1-\bar{x}_2}{\sqrt{s_p^2\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$	$s_p^2 = \frac{(n_1-1)s_1^2 + (n_2-1)s_2^2}{n_1+n_2-2}$	$\bar{x}_1 - \bar{x}_2 \pm t_{1-\alpha/2,n_1+n_2-2}\sqrt{s_p^2\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}$

$\bar{x}_d \pm t_{1-\alpha/2,n-1}\dfrac{s_d}{\sqrt{n}}$	$t = \dfrac{\bar{x}_d}{s_d/\sqrt{n}}$	$\sigma^2_{\bar{x}_d} = \dfrac{\sigma^2_d}{n}$
$X^2 = \sum_1^k \dfrac{(\text{obs} - \text{expected})^2}{\text{expected}}$ $df = k - 1$	expected = $n \times$ hypothesized proportion	$X^2 = \sum_{\text{all cells}} \dfrac{(\text{obs} - \text{expected})^2}{\text{expected}}$ $df = (r-1)(c-1)$
expected = $\dfrac{\text{row total} \times \text{col total}}{\text{grand total}}$	$V^2 = \dfrac{X^2}{n \times \min(r-1, c-1)}$	$r = \dfrac{S_{xy}}{\sqrt{S_{xx}S_{yy}}}$
$S_{xx} = \sum_{i=1}^n x_i^2 - n\bar{x}^2$ $= (n-1)S_x^2$	$S_{yy} = \sum_{i=1}^n y_i^2 - n\bar{y}^2$ $= (n-1)S_y^2$	$S_{xy} = \sum_{i=1}^n x_i y_i - n\bar{x}\bar{y}$ $= (n-1)S_{x,y}$
$y = \alpha + \beta x + \varepsilon$	$\hat{y} = a + bx$	$e = y - \hat{y}$
$\varepsilon \sim \mathrm{N}(0, \sigma_\varepsilon)$	$\mu_{y\|x} = \alpha + \beta x$	$b = \dfrac{S_{xy}}{S_{xx}}$
$a = \bar{y} - b\bar{x}$	$SSResid = \sum_{i=1}^n e_i^2$	$s_e^2 = \dfrac{SSResid}{n-2}$ $df = n - 2$
$SS\ Total = S_{yy}$	$r^2 = 1 - \dfrac{SSResid}{SS\ Total}$	$\sigma_b = \dfrac{\sigma_\varepsilon}{\sqrt{S_{xx}}}$
$s_b = \dfrac{s_e}{\sqrt{S_{xx}}}$	$b \pm t_{1-\alpha/2,n-2} \times s_b$	$t = \dfrac{b - \beta_0}{s_b}$ $df = n - 2$
$\sigma_{a+bx^*} = \sigma_\varepsilon \sqrt{\dfrac{1}{n} + \dfrac{(x^* - \bar{x})^2}{S_{xx}}}$	$s_{a+bx^*} = s_e \sqrt{\dfrac{1}{n} + \dfrac{(x^* - \bar{x})^2}{S_{xx}}}$	$a + bx^* \pm t_{1-\alpha/2,n-2} \times s_{a+bx^*}$
$\sigma_{\hat{y}-y} = \sigma_\varepsilon \sqrt{1 + \dfrac{1}{n} + \dfrac{(x^* - \bar{x})^2}{S_{xx}}}$	$s_{\hat{y}-y} = s_e \sqrt{1 + \dfrac{1}{n} + \dfrac{(x^* - \bar{x})^2}{S_{xx}}}$	$a + bx^* \pm t_{1-\alpha/2,n-2} \times s_{\hat{y}-y}$
$t = \dfrac{r\sqrt{n-2}}{\sqrt{1-r^2}}$ $df = n - 2$	$x_{ij} = \mu_i + \varepsilon_{ij}$	$e_{ij} = x_{ij} - \bar{x}_i$
$\varepsilon_{ij} \sim \mathrm{N}(0, \sigma_\varepsilon)$	$SS\ Total = \sum_{\text{all}} (x_{ij} - \bar{\bar{x}})^2$	$\bar{\bar{x}} = N^{-1} \sum_{i=1}^k n_i \bar{x}_i$
$SS\ Treat = \sum_{i=1}^k n_i(\bar{x}_i - \bar{\bar{x}})^2$	$df\ Treat = k - 1$	$SSE = \sum_{i=1}^k (n_i - 1)s_i^2$
$df\ Error = N - k$	$F = \dfrac{MS\ Treat}{MSE}$	$\bar{x}_i - \bar{x}_j \pm q\sqrt{\dfrac{MSE}{2}\left(\dfrac{1}{n_i} + \dfrac{1}{n_j}\right)}$
$R^2 = \dfrac{SS\ Treat}{SS\ Total}$		