EQUATIONS

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

$\bar{x}_d \pm t_{1-\alpha/2,n-1}\dfrac{s_d}{\sqrt{n}}$	$t = \dfrac{\bar{x}_d}{s_d/\sqrt{n}}$	$\sigma^2_{\bar{x}_d} = \dfrac{\sigma^2_d}{n}$
$X^2 = \sum_{i=1}^{k} \dfrac{(\text{obs}_i - \text{expected}_i)^2}{\text{expected}_i}$ $df = k-1$	$\text{expected}_i = n \times \pi_{i_0}$	$X^2 = \sum_{i=1}^{k} \dfrac{(\text{obs}_i - \text{expected}_i)^2}{\text{expected}_i}$ $df = (r-1)(c-1)$
$\text{expected}_i = \dfrac{(\text{row total})_i \times (\text{ col total})_i}{N}$	$V^2 = \dfrac{X^2}{n \times \min(r-1, c-1)}$	$r = \dfrac{1}{n-1}\sum_{i=1}^{n}\left(\dfrac{x_i - \bar{x}}{s_x}\right)\left(\dfrac{y_i - \bar{y}}{s_y}\right)$
$y = \beta_0 + \beta_1 x + \epsilon$	$\hat{y} = b_0 + b_1 x$	$e = y - \hat{y}$
$\epsilon \sim \text{N}(0, \sigma)$	$\mu_{y\|x} = \beta_0 + \beta_1 x$	$b_1 = r\dfrac{s_y}{s_x}$
$b_0 = \bar{y} - b_1\bar{x}$	$SSE = SSResid = \sum_{i=1}^{n} e_i^2$	$s^2 = MSE = \dfrac{SSE}{DFE}$ $DFE = n-2$
$s_y^2 = \dfrac{SSTo}{n-1}$	$r^2 = \dfrac{SSM}{SSTo}$	$\sigma^2_{b_1} = \dfrac{\sigma^2}{\sum(x_i - \bar{x})^2}$
$SE_{b_1} = \sqrt{\dfrac{MSE}{\sum(x_i - \bar{x})^2}}$	$b_1 \pm t_{1-\alpha/2,n-2} \times SE_{b_1}$	$t = \dfrac{b_1}{SE_{b_1}}$ $df = n-2$
$\hat{\mu} = b_0 + b_1 x^*$	$SE_{\hat{\mu}} = \sqrt{MSE\left(\dfrac{1}{n} + \dfrac{(x^* - \bar{x})^2}{\sum(x_i - \bar{x})^2}\right)}$	$\hat{\mu} \pm t_{1-\alpha/2,n-2} \times SE_{\hat{\mu}}$
$\hat{y} = b_0 + b_1 x^*$	$SE_{\hat{y}} = \sqrt{MSE\left(1 + \dfrac{1}{n} + \dfrac{(x^* - \bar{x})^2}{\sum(x_i - \bar{x})^2}\right)}$	$\hat{y} \pm t_{1-\alpha/2,n-2} \times SE_{\hat{y}}$
	$x_{ij} = \mu_i + \epsilon_{ij}$	$e_{ij} = x_{ij} - \bar{x}_i$
$\epsilon_{ij} \sim \text{N}(0, \sigma)$	$SSTo = \sum_{i,\ j}(x_{ij} - \bar{\bar{x}})^2$	$\bar{\bar{x}} = \dfrac{1}{N}\sum_{i=1}^{k} n_i \bar{x}_i$
$SSTr = \sum_{i=1}^{k} n_i(\bar{x}_i - \bar{\bar{x}})^2$	$DFTr = k-1$	$SSE = \sum_{i=1}^{k}(n_i - 1)s_i^2$
$DFE = N - k$	$F = \dfrac{MSTr}{MSE}$	$\bar{x}_i - \bar{x}_j \pm q\sqrt{\dfrac{MSE}{2}\left(\dfrac{1}{n_i} + \dfrac{1}{n_j}\right)}$
$R^2 = \dfrac{SSTr}{SSTo}$	$MS = \frac{SS}{DF}$	$SSTo = SSTr + SSE$
$DFTo = n-1$	$DFTo = DFTr + DFE$	