EXAM 3 FORMULA SHEET

$\bar{x} = (\Sigma x_i)/n$ $s^2 = \{1/(n-1)\}[\Sigma x^2_i - (1/n)(\Sigma x_i)^2]$ $df_{scary}=[s^2_1/n_1 + s^2_2/n_2]^2 / [(s^2_1/n_1)^2/(n_1-1) + (s^2_2/n_2)^2/(n_2-1)]$

$\bar{d} = (\Sigma d_i)/n$ $s^2_d = \{1/(n-1)\}[\Sigma d^2_i - (1/n)(\Sigma d_i)^2]$

$\bar{p} = x/n$ $\bar{p}_{pool} = (x_1 + x_2) / (n_1 + n_2)$

Inference on $\mu_1 - \mu_2$, Unknown σs, Indep.Samples

$t_{stat} = [(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)_0] / \sqrt{[(s^2_1/n_1) + (s^2_2/n_2)]}$

C.I.: $(\bar{x}_1 - \bar{x}_2) \pm t_{\alpha/2,df} \sqrt{[(s^2_1/n_1) + (s^2_2/n_2)]}$

Inference on $\mu_1 - \mu_2$, Unknown σs, Dep.Samples ($\mu_1 - \mu_2 = \mu_d$)

$t_{stat} = (\bar{d} - \mu_{d,0}) / (s_d/\sqrt{n})$

C.I.: $\bar{d} \pm t_{\alpha/2,n-1} (s_d/\sqrt{n})$

Inference on $p_1 - p_2$, Large Indep.Samples, $(p_1 - p_2)_0 = 0$

$Z_{stat} = [(\bar{p}_1 - \bar{p}_2) - 0] / \sqrt{[\{\bar{p}_{pool}(1- \bar{p}_{pool})/n_1\} + \{\bar{p}_{pool}(1- \bar{p}_{pool})/n_2\}]}$

C.I.: $(\bar{p}_1 - \bar{p}_2) \pm Z_{\alpha/2} \sqrt{[\{\bar{p}_1(1- \bar{p}_1)/n_1\}+ \{\bar{p}_2(1- \bar{p}_2)/n_2\}]}$

$\bar{x} = \Sigma x_i/n$ $\bar{y} = \Sigma y_i/n$ $SS_{xx} = \Sigma x^2_i - (1/n)(\Sigma x_i)^2 = \Sigma(x_i - \bar{x})^2$

$SS_{yy} = \Sigma y^2_i - (1/n)(\Sigma y_i)^2 = \Sigma(y_i - \bar{y})^2$ $SS_{xy} = \Sigma x_i y_i - (1/n)(\Sigma x_i)(\Sigma y_i) = \Sigma[(x_i - \bar{x})(y_i - \bar{y})]$

$b_1 = SS_{xy}/SS_{xx}$ $b_0 = \bar{y} - b_1 \bar{x}$ $\hat{y} = b_0 + b_1 x$

$df_{Reg} = 1$ $SSR = b_1 * SS_{xy} = \Sigma(\hat{y}_i - \bar{y})^2$ $MSR = SSR/df_{Reg}$

$df_{Err} = n - 2$ $SSE = SST - SSR = \Sigma(y_i - \hat{y}_i)^2$ $MSE = SSE/df_{Err} = s^2_e$

$df_{Tot} = n - 1$ $SST = SS_{yy} = \Sigma(y_i - \bar{y})^2$

$r^2 = SSR/SST$ $r = \bigstar\sqrt{r^2}$ (where $\bigstar$ is sign of b_1) $GlobalF_{stat} = MSR/MSE$

$s_{b1} = \sqrt{[MSE/SS_{xx}]}$ C.I. for β_1: $b_1 \pm t_{\alpha/2,n-2} * s_{b1}$ $t_{stat} = [b_1 - 0] / s_{b1}$

$s_{\hat{y}} = \sqrt{[MSE\{1/n + (x_0 - \bar{x})^2/SS_{xx}\}]}$ C.I. for the mean of y given $x=x_0$: $\hat{y} \pm t_{\alpha/2,n-2} * s_{\hat{y}}$

$s_{ind} = \sqrt{[MSE\{1 + 1/n + (x_0 - \bar{x})^2/SS_{xx}\}]} = \sqrt{[MSE+(s_{\hat{y}})^2]}$ for the same x_0

P.I. for an individual y given $x=x_0$: $\hat{y} \pm t_{\alpha/2,n-2} * s_{ind}$