Formula Sheet

$$(AB)' = B'A'$$

$$(AB)^{-1} = B^{-1}A^{-1}$$

$$AA^{-1} = I$$

$$E(a\underline{x} + \underline{b}) = aE(\underline{x}) + \underline{b}$$

$$Var(\underline{a}'\underline{x}) = \underline{a}'Var(\underline{x})\underline{a}$$

One sample mean t-test

$$t = \frac{(\bar{x} - \mu_0)}{\frac{s}{\sqrt{n}}}$$

$$df = n - 1$$

Two sample t-test, equal variance

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{s_p\sqrt{\frac{1}{n_1} + \frac{1}{n_2}}} \qquad s_p = \sqrt{\frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}}$$

$$df = n_1 + n_2 - 2$$

Two Sample t-test, unequal variance

$$t = \frac{(\bar{x}_1 - \bar{x}_2) - (\mu_1 - \mu_2)}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

$$df = \frac{(\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2})^2}{\frac{1}{n_1 - 1}\left(\frac{s_1^2}{n_1}\right)^2 + \frac{1}{n_2 - 1}\left(\frac{s_2^2}{n_2}\right)^2}$$

Dependent Samples t-test

$$t = \frac{\bar{d} - \Delta}{\frac{s_d}{\sqrt{n}}} \quad \text{df = n-1}$$

2 Independent Sample z-test (proportions)

$$z = \frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}_c(1-\hat{p}_c)\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$$

One Way ANOVA formulas:

$$SS_{within} = \sum_{i\,j}\left(y_{ij} - \bar{y}_j\right)^2$$

$$SS_{between} = \sum_{j} n_j\left(\bar{y}_j - \bar{y}_{..}\right)^2$$

$$SS_{total} = \sum_{i}\left(y_{ij} - \bar{y}_j\right)^2$$

For chi-square

$$\chi^2 = \sum \frac{(obs - \exp)^2}{\exp}$$

df=(r-1)(c-1)

For random variable x:

$$\mu_x = \sum x_i p_i$$

$$\sigma_x^{\,2} = \sum (x_i - \mu_x)^2 p_i$$

For binomial:

$$\mu_x = \sum np$$

$$\sigma_x^{\,2} = \sum np(1-p)$$

$P(X=x) = \binom{n}{x} p^x (1-p)^{n-x}$,where x = 0, 1, 2, 3,…, n

TI-83:

P(X = x) = binompdf (n, p, x)

P(X ≤ x) = binomcdf (n, p, x)