Formula Sheet – Test 2
STAT 515 – Summer I 2007

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

$\overline{X} \pm t_{\alpha/2}\left(\frac{s}{\sqrt{n}}\right)$ where $t_{\alpha/2}$ is based on $n - 1$ d.f.

$$\hat{p} \pm z_{\alpha/2}\sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

$$\left(\frac{(n-1)s^2}{\chi^2_{\alpha/2}}, \frac{(n-1)s^2}{\chi^2_{1-\alpha/2}}\right)$$

Sample size formulas: $n = \frac{(z_{\alpha/2})^2 \sigma^2}{B^2}$, $n = \frac{(z_{\alpha/2})^2 pq}{B^2}$

Test statistic for t-test about μ: $\frac{\overline{X} - \mu_0}{s/\sqrt{n}}$

(For test about μ_D in paired-sample problems, test statistic is same except use $\overline{D}$ and s_D)

Test statistic for z-test about p: $\frac{\hat{p} - p_0}{\sqrt{\frac{p_0(1-p_0)}{n}}}$

$(\overline{X}_1 - \overline{X}_2) \pm t_{\alpha/2}\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}$ where $t_{\alpha/2}$ is based on $\min(n_1 - 1, n_2 - 1)$ d.f., or

$(\overline{X}_1 - \overline{X}_2) \pm t_{\alpha/2}\sqrt{\frac{s_p^2}{n_1} + \frac{s_p^2}{n_2}}$ where $t_{\alpha/2}$ based on $n_1 + n_2 - 2$ d.f., and

$$s_p^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}.$$

Test statistic for comparing two means (independent samples):

$$\frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}} \text{ or } \frac{\overline{X}_1 - \overline{X}_2}{\sqrt{\frac{s_p^2}{n_1} + \frac{s_p^2}{n_2}}}$$

$$(\hat{p}_1 - \hat{p}_2) \pm z_{\alpha/2}\sqrt{\frac{\hat{p}_1(1-\hat{p}_1)}{n_1} + \frac{\hat{p}_2(1-\hat{p}_2)}{n_2}}$$

$\frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\hat{p}\hat{q}\left(\frac{1}{n_1} + \frac{1}{n_2}\right)}}$ where $\hat{p}$ is the pooled sample proportion.