Statistics Formula Sheet

$$\bar{x} = \frac{\sum x}{n} \qquad s^2 = \frac{n\sum x^2 - (\sum x)^2}{n(n-1)} \qquad s = \sqrt{\frac{n\sum x^2 - (\sum x)^2}{n(n-1)}}$$

Probability

$$p(E) = \frac{n(E)}{n(S)} \qquad p(non\ E) = 1 - p(E)$$

$$p(E\ or\ F) = p(E) + p(F) - p(E\ and\ F)$$

$$p(E \,|\, F) = \frac{n(E\ and\ F)}{n(F)} \qquad p(A\ and\ B) = p(A)p(B|A)$$

Normal Distribution

$$z = \frac{x-\mu}{\sigma} \qquad x = \mu + z\sigma$$

Expected Value

$$\mu = \sum_{all\ x} xp(x)$$

Estimation about a single parameter

$$\bar{x} - E < \mu < \bar{x} + E \qquad E = z_{\propto/2}\frac{s}{\sqrt{n}} \text{ and } E = t_{\propto/2}\frac{s}{\sqrt{n}}$$

$$\bar{p} - E < \mu < \bar{p} + E \qquad E = z_{\propto/2}\sqrt{\frac{\bar{p}(1-\bar{p})}{n}}$$

$$\frac{(n-1)s^2}{\chi_R} < \sigma^2 < \frac{(n-1)s^2}{\chi_L} \qquad \sqrt{\frac{(n-1)s^2}{\chi_R}} < \sigma < \sqrt{\frac{(n-1)s^2}{\chi_L}}$$

Hypothesis Testing about a single parameter

$$ts = \frac{\bar{x}-\mu}{s/n} \qquad ts = \frac{\bar{p}-p}{\sqrt{\frac{p(1-p)}{n}}} \qquad p = \frac{x}{n}$$

Hypothesis Testing comparing two parameters

$$ts = \frac{\bar{x}_1-\bar{x}_2}{\sqrt{\frac{{s_1}^2}{n_1}+\frac{{s_2}^2}{n_2}}} \qquad ts = \frac{\bar{p}_1-\bar{p}_2}{\sqrt{\frac{\tilde{p}(1-\tilde{p})}{n_1}+\frac{\tilde{p}(1-\tilde{p})}{n_2}}} \qquad \tilde{p} = \frac{x_1+x_2}{n_1+n_2}$$