

Formula Sheet – Test 2 – STAT 515

For $X \sim \text{Exponential}(\theta)$:

$$P(X \geq a) = e^{-a/\theta}$$

For $X \sim \text{Uniform}(c,d)$:

$$P(a < X < b) = \frac{b-a}{d-c}, \quad \mu = \frac{c+d}{2}, \quad \sigma = \frac{d-c}{\sqrt{12}}$$

$$Z = \frac{X - \mu}{\sigma}, \quad X = Z\sigma + \mu$$

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

$$\bar{x} \pm t_{\alpha/2}(s/\sqrt{n}),$$

where $t_{\alpha/2}$ based on $n - 1$ df

Classical CI for p :

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

Agresti-Coull CI for p :

$$p^* \pm z_{\alpha/2} \sqrt{\frac{p^*(1-p^*)}{n+4}}$$

where $p^* = \frac{x+2}{n+4}$.

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

$$\left(\frac{s_1^2/s_2^2}{F_{\alpha/2}(n_1-1, n_2-1)}, \frac{s_1^2/s_2^2}{1/F_{\alpha/2}(n_2-1, n_1-1)} \right)$$

Sample size formulas:

$$n = \frac{(z_{\alpha/2})^2 \sigma^2}{B^2}, \quad n = \frac{(z_{\alpha/2})^2 pq}{B^2}$$