STA 474 Practice Problems 2

1. Problem 8.21, page 402.

2. Refer to problem 8.39, page 409.
a. Find an unbiased point estimator for β.
b. Find a 90% two-sided confidence interval estimator for β with equal tail areas.

3. What conditions must be met so that the confidence interval for μ in Section 8.8 is valid? This small-sample confidence interval for μ, based on the t-distribution, possesses a random length. Find the expected value of the interval length.

4. Suppose $Y_1, ..., Y_n \overset{iid}{\sim} Uniform[0, \theta]$. Consider the two unbiased estimators $\widehat{\theta_1} = 2\overline{Y}$ and $\widehat{\theta_2} = \frac{n+1}{n} Y_{(n)}$.
a. Is $\widehat{\theta_2}$ a consistent estimator of θ?
b. Find the efficiency of $\widehat{\theta_1}$ relative to $\widehat{\theta_2}$ and discuss your results.

5. Suppose $Y_1, ..., Y_n \overset{iid}{\sim}$ Gamma with parameters $\alpha = 2$ and β unknown.
a. Find a one-dimensional sufficient statistic for β.
b. Show that the pdf of Y is a member of the exponential family of distributions.

6. Problem 9.57, page 470.