STA 200B Homework 2
Due: Wednesday, Jan. 22, in class

Reading Assignment: 7.2, 7.3

Problems:

Section 7.5: 8, 10

Section 7.6: 3, 8, 23a (see Section 5.8 of the textbook for definition and properties of Beta distributions).

Section 7.10: 4, 10

Additional problems:

1. Let $X_1, \ldots, X_n$ be a random sample (i.i.d.) from an exponential distribution, Exp(λ), with rate λ.

   (a) Find a method of moments estimator of λ using only the first moment.

   (b) Find a method of moments estimator using only the second moment.

   (c) Find a third method of moments estimator using both the first and second moments.

   (d) Find a method of moments estimator for $P(X_1 \geq 1)$.

2. A Pareto distribution has c.d.f of the form

$$F(x \mid \theta_1, \theta_2) = 1 - \left(\frac{\theta_1}{x}\right)^{\theta_2}, \quad \theta_1 \leq x, \theta_1 > 0, \theta_2 > 0. \tag{1}$$

   Find the MLE for (θ_1, θ_2).

3. Show that if $\hat{\theta}$ is a methods of moment estimator of θ, then for any one to one function g it holds that $g(\hat{\theta})$ is a methods of moment estimator of $g(\theta)$.