

STAT/MA 41600  
Practice Problems: December 5, 2014

1. Consider  $X_1, X_2, X_3, X_4$  which are independent and uniformly distributed on  $[0, 20]$ .
  - a. Find the density of the first order statistic, i.e., find  $f_{X_{(1)}}(x_1)$ .

- b. Find the density of the second order statistic, i.e., find  $f_{X_{(2)}}(x_2)$ .

**2.** Same setup as Question #1.

**a.** Find the expected value of the first order statistic, i.e., find  $\mathbb{E}(X_{(1)})$ .

**b.** Find the expected value of the second order statistic, i.e., find  $\mathbb{E}(X_{(2)})$ .

- 3.** Let  $X_1$  and  $X_2$  be the waiting times for Alice and Bob until their respective phones ring. Assume that  $X_1, X_2$  are independent exponentials, each with mean 10.
- a.** Find the density of the first order statistic,  $X_{(1)}$ , i.e., find  $f_{X_{(1)}}(x_1)$ .

- b.** Find the density of the second order statistic,  $X_{(2)}$ , i.e., find  $f_{X_{(2)}}(x_2)$ .

4. Same setup as Question #3.

a. Find the expected value of the first order statistic, i.e., find  $\mathbb{E}(X_{(1)})$ .

b. Find the expected value of the second order statistic, i.e., find  $\mathbb{E}(X_{(2)})$ .

5. Let  $X_1, X_2$  be independent, identically distributed, each with density  $f_X(x) = 6(x - x^2)$  for  $0 < x < 1$ , and  $f_X(x) = 0$  otherwise.
- Find the density of the first order statistic,  $X_{(1)}$ .

- Find the expected value of the first order statistic, i.e., find  $\mathbb{E}(X_{(1)})$ .