

STAT/MA 41600
In-Class Problem Set #31: October 29, 2014
(there is no Problem Set #30)

1. Suppose that X and Y have a constant joint density on the triangle with vertices located at the points $(0, 0)$, $(5, 0)$, $(0, 5)$. Find $\mathbb{E}(\max(X, Y))$.

2. Suppose that

$$F_X(x) = \begin{cases} 0 & \text{if } x \leq 3 \\ \frac{x-3}{4} & \text{if } 3 < x < 7 \\ 1 & \text{if } x \geq 7 \end{cases}$$

2a. Find $\mathbb{E}(X)$.

2b. Find $\text{Var}(X)$.

3. Suppose U, V, W are independent, continuous random variables, each uniformly distributed on the interval $[0, 5]$. Define $X = \max(U, V, W)$.

3a. Find the cumulative distribution function of X .

3b. Find the probability density function of X .

4. Suppose that U is uniformly distributed on the interval $[0, 10]$.

4a. Find $P(U > 7)$.

4b. Find the standard deviation of U .

5. Let $X = 3Y + 5$, where Y is uniformly distributed on the interval $[0, 5]$.

5a. Find $\mathbb{E}(X)$.

5b. Find $\text{Var}(X)$.

6. Suppose that U, V, W, X are independent, continuous random variables, each uniformly distributed on the interval $[0, 5]$. Find the probability that U is the largest of these four random variables.