ECE 313
In-Class Activity 4

Write your name and UID here:

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Q1. (a) Find $P(X > \sqrt{Y})$ if X and Y are jointly distributed with PDF

$$f(x,y) = x + y, \qquad 0 \le x \le 1, 0 \le y \le 1.$$

(b) Find $P(X^2 < Y < X)$ if X and Y are jointly distributed with PDF

$$f(x,y) = 2x, \qquad 0 \le x \le 1, 0 \le y \le 1.$$

Q2. Let X, Y, and Z be independent uniform(0,1) random variables.

(a) Find $P(\frac{X}{Y} \le t)$ and $P(XY \le t)$.

(b) Find $P\left(\frac{XY}{Z} \le t\right)$.

Q3. Suppose the distribution of Y, conditional on $X = x$, is $N(x, x^2)$ and the marginal distribution of X is uniform(0,1).

(a) Find E(X), Var(Y) and Cov(X,Y).

(b) Show that whether Y/X and X are independent or not.