Jt. Prob. Dists. with Constraints - Practice

1. Let X and Y be jtly continuous RVs with pdf $f(x,y) = k(x-y)$ when $0 \le y \le x \le 1$, and 0, o.w.

   a. Find the value of k that makes this a valid pdf.

   b. Find $F(\frac{5}{6}, \frac{1}{2})$.

   c. Find $P(X \ge \frac{3}{4}, Y \ge \frac{1}{4})$.

   d. Find $P(X \ge 2Y)$.

   e. Find $P(X+Y \le 1)$.

2. Let X and Y be jtly cont. RVs with pdf $f(x,y) = 2e^{-(x+y)}$ when $0 < x < y < \infty$, and 0, o.w.

   a. Find $F(5,3)$.

   b. Find $P(X > 3, Y > 6)$.

   c. Find $P(Y > 3X)$.

   d. Find $P(X+Y \le 10)$.

3. Let X be $Uni(0,1)$. Let $Y|X$ be $Uni(0, x^2)$. What is the jt pdf of X and Y? (6.2 material)

4. a. In problem 1, find the marginal pdf of X.

   b. In problem 2, find the marginal pdf of Y.

   c. In problem 1, find $f_{Y|X}$ and find $P(Y \le \frac{1}{2} \mid X = \frac{2}{3})$.

   d. In problem 2, find $f_{X|Y}$ and find $P(X > 1 \mid Y = 4)$.