IAM 530 2014-2015 Fall

Homework 4

1) Suppose the joint pdf of lifetimes of a certain part and a spare is given by
$f(x, y) = e^{-(x+y)}$ $0 < x < \infty$ $0 < y < \infty$
   a) Find marginal pdf's for f(x) and f(y)
   b) Find joint CDF F(x,y)
   c) Find P(X+Y>2)

2) Suppose X_1 and X_2 are discerete random variables with following joint pmf

X_1 \ X_2	1	2	3
1	1/12	1/6	0
2	0	1/9	1/5
3	1/18	1/4	2/15

   a) Find marginal pdf's for X_1 and X_2
   b) Are X_1 and X_2 independent?
   c) Find conditinal pdf f(x_1|x_2).

3) Suppose the joint pdf of X and Y is $f(x, y) = 1$ $0 < x < 1$ $0 < y < 2x$
   a) Find conditinal pdf f(y|x).
   b) Find E(Y|X).

4) Let X be a random variable with pdf $f(x) = 4x^3$ $0 < x < 1$ find pdf of Y=e^X.

5) Suppose the joint pdf of X and Y is $f(x, y) = 4e^{-2(x+y)}$ $0 < x < \infty$ $0 < y < \infty$. Find the joint pdf of U=X/Y and Y=X

6) Let $X_1, \ldots, X_n$ be random sample from a distribution with pdf $f(x) = 1/x^2$ $1 \leq x < \infty$
   a) Find joint pdf of the order statistics.
   b) Find the pdf of the smallest order statistic Y_1.
   c) Find the pdf of the largest order statistic Y_n.
   d) Derive th pdf of sample range R=Y_n-Y_1 (for n=2).