MATH 611

Homework 10

1. Suppose the vector of random variables (X,Y) has the joint density function:

Show that the conditional density f(x|y) has the gamma density and identify the parameters of this density.

1. For the joint density in question 1, show that that the conditional density f(y|x) has the Poisson density.
2. Write an R-function to implement Gibbs sampling when the constants are a=1, b=1.
3. For a total of m=5000 iterations of the function from question 3, give a graphical display of the bivariate distribution of (X,Y) and the marginal density of Y. What is E(Y)?
4. For the Beta Blockers data set, consider the observations from center (clinical site) 1 only. Use the appropriate transformations to the data frame to create a binary random variable (1=Death, 0=No Death). Use ‘MCMCpack’ to generate a sample from the posterior distribution of a logistic regression model using a random-walk Metropolis Hastings algorithm and a multivariate normal prior of your choice. Present the plots of this model.