Bent E. Sørensen

ECONOMICS 6331 – Probability and Statistics, Fall 2007

Homework 5. Wednesday October 10. Due Wednesday October 17 .

1. Practice problem 5.1 in Ramanathan, p. 84.

2. Assume you roll two dice. Let X be the number of times you observe 1 or 3 eyes and let Y be the number of times you observe a 3. Derive
a) the joint probability distribution $f(x, y)$ (as in example 5.1).
b) $f_X(x)$, the marginal probability function for X.
c) $f_Y(y)$, the marginal probability function for Y.
d) $P(X < Y)$.
e) $P(Y = 2X)$.
f) $P(X + Y = 2)$.
g) Are X and Y independent or dependent?

3. Let $f(x, y) = (3/16) xy^2$; $0 < x < 2$, $0 < y < 2$, be the joint density function for X and Y. Find the marginal density functions $f_X(x)$ and $f_Y(y)$. Find the distribution function (CDF) for X. Are the two random variables independent?

4. Let $f(x, y) = 1/6 \, e^{-x/2 - y/3}$ be the joint density function for X and Y. Find the marginal density functions $f_X(x)$ and $f_Y(y)$. Are the two random variables independent?