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ECONOMICS 6331 – Probability and Statistics, Fall 2005

Homework 4. Wednesday October 19. Due Tuesday October 25.

1. Assume you roll a two dice. Let X be the number times you observe 1 or 2 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?

2. 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 $F_Y(y)$. Are the two random variables independent?

3. 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?