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ECONOMICS 6331 – Probability and Statistics, Fall 2006

Homework 6. Wednesday October 18. Due Monday October 23.

1. Consider two random variables X and Y. Assume they both are discrete and that X can take the values 1,2, and 3 while Y takes the values 0 and 2. The probabilities for (X,Y) are shown in the following table:

	X=1	X=2	X=3
Y=0	3/24	3/24	6/24
Y=2	3/24	5/24	4/24

i) Find the marginal probabilities of X and Y. Mark clearly which are the marginal probabilities of X and which are the marginal probabilities of Y. Explain what the marginal probabilities measure.
ii) Find the means and the variances of X and Y.
iii) Are the events $X = 1$ and $Y = 2$ independent events?
iv) Are the random variables X and Y independent?
v) Find the probability $P(\{X > 1\} \bigcap \{Y \leq 1\})$
vi) Find the conditional distribution of X given $Y = 2$.
vii) Find the random variable $E(X|Y)$.
viii) Take the mean of the random variable that you derived in vii) and verify that it equals $E(X)$.
ix) Find $Var(X|Y = 2)$.

2. Ramanathan, Exercise 5.1, page 117.