4/8/2010   MA371 Intro. to Prob. & Stats.   Name:_____

Dr. Lunsford   Quiz 8   (45 Points Total)

Neatly show all work on this quiz.

Problem I.   Suppose the random variables X and Y have joint probability mass function given by

$$f(x, y) = \frac{x+y}{21} \text{ for } x = 1, 2, 3 \text{ and } y = 1, 2.$$ Please answer the following questions: (14 points total)

(a) Find the marginal mass function for X (i.e. find $f_X(x)$). (5 points)

(b) Find the marginal mass function for Y (i.e. find $f_Y(y)$). (5 points)

(c) Are X and Y independent? Why or why not? (4 points)

Problem II.   Suppose X_1 and X_2 are independent random variables with standard deviations of 3 and 4, respectively, and with $E\ X_1 = 5$ and $E\ X_2 = -7$. Let $Y = \frac{X_1 + X_2}{2}$. Find each of the following. Please show at least one intermediate step or give a logical reason for your answer.   (16 points total)

(a) cov X_1, X_2
(3 points)

(b) $E\ Y$
(4 points)

(c) The standard deviation of Y.
(4 points)

(d) $E\left[X_1 + X_2 {}^2 \right]$
(5 points)

Problem III. Suppose the random variables X and Y have a joint probability density function given by

$f(x, y) = x + y$ for $0 \le x \le 1$ and $0 \le y \le 1$. Please answer the following questions: (15 points total)

(a) Find $P\left(X < \dfrac{3}{4}\right)$

(5 points)

(b) Set up the integral (DO NOT INTEGRATE) to find $P\left(2Y + X \le 1\right)$.

(5 points)

(c) Find $E[Y]$

(5 points)