MATH 321: Review Part 1

- 1. Let (X,Y) be a bivariate continuous random vector with joint pdf f(x,y)=3x for $0\leq y\leq x\leq 1$.
 - (a) Find $P(X \ge 0.5, Y \ge 0.5)$.

(b) Show if $X \perp \!\!\!\perp Y$ using the definition.

(c) Find the conditional pdfs $f(x \mid y)$ and $f(y \mid x)$.

(d) Using result from (c), find $E(X \mid Y = 0.5)$.

- 2. Let (X,Y) be a bivariate continuous random vector with joint pdf f(x,y)=4xy for $0\leq x\leq 1, 0\leq y\leq 1$.
 - (a) Find $P(Y \ge X)$.

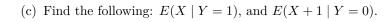
- (b) Show if $X \perp \!\!\!\perp Y$ by inspection.
- (c) Using result from (b), find $E(X^4Y)$

3. Let (X,Y) be a bivariate discrete random vector with joint pmf table:

$\begin{bmatrix} x \\ y \end{bmatrix}$	0	1
0	2/9	3/9
1	2/9	1/9
2	1/9	0

(a) Find the following probabilities: $P(X \le 1, Y = 0)$, $P(X + 1 \le Y)$, and $P(Y^2 = X)$.

(b)	Find the marginal	pmfs of X	and Y .	Also find	the conditional	pmfs of	$f(x \mid Y)$	= 0	and
	$f(x \mid Y = 1).$								



(d) Find
$$Cov(X, Y)$$
.

(e) Find
$$Corr(X, Y)$$
.

(f) Find
$$V(X+Y)$$
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