MATH 302 WORKSHEET 3½ SPRING 2009 NAME:____

(PLEASE PRINT LEGIBLY)

JOINT PROBABILITY MASS FUNCTIONS, CONDITIONAL PROBABILITY MASS FUNCTIONS, VERSUS MARGINAL PROBABILITY MASS FUNCTIONS.

1. Let X, Y be jointly distributed such that the joint probability mass function, $k_{xy}((x, y))$ is defined as:

$$k_{xy}((x, y)) = \begin{cases} \dfrac{x+y}{21} & x \in \mathbb{N}_3 \quad y \in \mathbb{N}_2 \\ 0 & \text{else} \end{cases}$$

A. Find the conditional p. m. f. of X given Y =1
B. Find the conditional p. m. f. of X given Y = 2
C. Find the conditional p. m. f. of Y given X = 1
D. Find the conditional p. m. f. of Y given X = 2
E. Find the conditional p. m. f. of Y given X = 3
F. Find the marginal p. m. f. of X
G. Find the marginal p. m. f. of Y

2. Let X, Y be jointly distributed such that the joint probability mass function, $j_{xy}((x, y))$ is defined as:

$$j_{xy}((x, y)) = \begin{cases} \dfrac{xy^2}{30} & x \in \mathbb{N}_3 \quad y \in \mathbb{N}_2 \\ 0 & \text{else} \end{cases}$$

A. Find the conditional p. m. f. of X given Y =1
B. Find the conditional p. m. f. of Y given X = 2
C. Find the conditional p. m. f. of Y given X = 4
D. Find the marginal p. m. f. of X

3. Let $X, Y \sim h((x,y))$ be defined such that

$$h((x,y)) = \begin{cases} \dfrac{n!}{x!y!(n-x-y)!} \cdot p_1^x \cdot p_2^y \cdot (1-p_1-p_2)^{n-x-y} & x \in \mathbb{N}^* \quad y \in \mathbb{N}^* \quad x+y \le n \\ 0 & \text{else} \end{cases}$$

Let $p_1 = \frac{1}{5}$, $p_2 = \frac{2}{5}$, and $n = 5$

A. Find the conditional p. m. f. of X given Y =1
B. Find the conditional p. m. f. of Y given X = 2
C. Find the conditional p. m. f. of Y given X = 4
D. Find the conditional p. m. f. of X given Y = 5
E. Find the marginal p. m. f. of Y