

MATH 302 WORKSHEET III SPRING 2009 NAME: _____
(PLEASE PRINT LEGIBLY)

1. Let $X, Y \sim k((x,y))$ such that $k((x,y)) = \begin{cases} \frac{3}{2}x^2(1-|y|) & -1 \leq x \leq 1, \quad -1 \leq y \leq 1 \\ 0 & \text{else} \end{cases}$

- A. Find $k_X(x)$
- B. Find $k_Y(y)$
- C. Find $E[X]$
- D. Find $E[Y]$
- E. Find $E[XY]$

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

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

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

- A. Find $p_X(x)$
- B. Find $p_Y(y)$
- C. Find $E[X]$
- D. Find $E[Y]$
- E. Find $E[XY]$

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

$$m((x,y)) = \begin{cases} \frac{x+y}{32} & x \in \mathbb{N}_2, \quad y \in \mathbb{N}_4 \\ 0 & \text{else} \end{cases}$$

- A. Find $m_X(x)$
- B. Find $m_Y(y)$
- C. Find $E[X]$
- D. Find $E[Y]$
- E. Find $E[XY]$

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

$$g((x,y)) = \begin{cases} \frac{1}{16}e^{-\left(\frac{x+y}{8}\right)} & x \in [0, \infty) \quad y \in [0, \infty) \\ 0 & \text{else} \end{cases}$$

- A. Find $g_X(x)$
- B. Find $g_Y(y)$
- C. Find $E[X]$
- D. Find $E[Y]$
- E. Find $E[XY]$