

1. Let X and Y be discrete random variables with the following joint PF:

$$f_{X,Y}(x,y) = \begin{cases} \frac{1}{7}(x-y)^2 & \text{for } x = 0, 1, 2 \text{ and } y = 0, 1 \\ 0 & \text{otherwise} \end{cases}$$

- (a) Find the marginal PF of X :

- (b) Find the marginal PF of Y

- (c) Are X and Y independent?

- (d) Find $f_{X|Y}(x|y)$.

- (e) Find $P(X = 2|Y = 1)$.

2. Let X and Y be continuous random variables with the following joint PF:

$$f_{X,Y}(x,y) = \begin{cases} \frac{3}{2}y^2 & \text{for } 0 \leq x \leq 2 \text{ and } 0 \leq y \leq 1 \\ 0 & \text{otherwise} \end{cases}$$

(a) Are X and Y independent?

3. Let X be a discrete random variable and Y be continuous random variable with the following joint PF:

$$f_{X,Y}(x, y) = \begin{cases} \frac{3}{20}y^x & \text{for } x = 0, 1, 2 \text{ and } 0 \leq y \leq 2 \\ 0 & \text{otherwise} \end{cases}$$

(a) Find the marginal PF of X :

(b) Find $f_{Y|X}(y|x)$.

(c) Find $P(0 \leq Y \leq 1|X = 0)$.