Problem 1: Joint PMF for Rolling a Die Twice

An experiment consists of rolling an unbiased die two times. The random variables Xi ∼ Uniform{1,2,3,4,5,6} represent the number on the ith roll, where i =1,2. Calculate: fX1,X2 (3,2)

Fx1,x2(3,2)=1/36

Problem 2: Drawing Queens and Kings from a Deck

From a well-shuffled deck of 52 cards, four cards are selected at random. Let the random variable X denote the number of queens drawn, and let the random variable Y denote the number of kings drawn. Find: fX,Y (2,1)

fX,Y​(2,1)=1056/270725 ​≈ 0.0039

Problem 3: Joint PMF of Two Discrete Random Variables

The joint probability mass function of two discrete random variables X and Y is given by: fX,Y (x,y) = xy/9 , x,y ∈ {1,2}

Fx,y(1,1)=1/9

Fx,y(1,2)=2/9

Fx,y(2,1)=2/9

Fx,y(2,2)=4/9

Problem 4: Conditional Probability from a Joint PMF Table Let X and Y be two random variables with joint PMF fX,Y(t1,t2) given by:

t2\t1 1 2 3

1 0 0.10 0.08

2 0.20 0.10 0

3 0.02 0.30 0.20

Find:

1. The range of (Y | X = 1).

2. fX|Y=2(1).

1. Range(Y∣X=1)={2,3}
2. fX∣Y=2​(1)=2/3