Probability Questions

Problem 1: Joint PMF for Rolling a Die Twice

An experiment consists of rolling an unbiased die two times. The random vari-

ables Xi ∼ Uniform{1, 2, 3, 4, 5, 6} represent the number on the ith roll, where

i = 1, 2. Calculate:

fX1,X2 (3, 2)

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)

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}

Calculate:

fX (1) + fX (2)

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).

ANSWERS

1. 1/36
2. 1056/270725
3. 1/3 + 2/3 = 1
4. a. Range = {2.3}

b. fX|Y =2(1) = 0.20/0.30 = 0.667