

Homework 7.5: Joint Distributions

1. Four cards are drawn from a deck. Let X be the number of kings drawn and Y the number of queens. Find $f_{X,Y}(x, y)$.
2. Two dice are tossed. Let X be the number of 2's that appear and Y the number of 3's. Write the matrix giving $f_{X,Y}(x, y)$. Define a third random variable Z by $Z = X + Y$. Use $f_{X,Y}(x, y)$ to find $f_Z(z)$.
3. Let X and Y be continuous random variables with joint pdf

$$f_{X,Y}(x, y) = \begin{cases} 2e^{-(x+y)} & 0 < x < y, 0 < y \\ 0 & \text{otherwise} \end{cases}$$

Find $P(Y < 3X)$.