

Math 5710: Introduction to Joint Distributions

Example 1

A fair coin is tossed three times; let X denote the number of heads on the first toss and Y the total number of heads. How are X and Y related to each other? Fill in the following probability frequency table.

	0	1	2	3
0				
1				

Example 2

Draw 5 cards from a standard deck. Let X be the number of face cards and let Y be the number of aces. Find the joint probability frequency (mass) function of X and Y . Find the probability that $X > Y$.

.

Example 3

A point (X, Y) is chosen randomly from the interior of the circle $x^2 + y^2 = 1$. How are X and Y related?

Example 4

(Buffon's Needle Problem) A needle of length L is dropped randomly on a plane marked with parallel lines that are a distance D apart, where $D \geq L$. Show that the probability that the needle comes to rest crossing a line is

$$\frac{2L}{\pi D}.$$