Stat 134: Section 8

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Problem 1

Let X be a random variable with values $\{1,2\}$ and Y a random variable with values $\{0,1,2\}$. Initially, we have the following partial information about their joint probability mass function.

	$Y = 0$	$Y = 1$	$Y = 2$
$X = 1$	1/8		
$X = 2$		0	

Subsequently, we learn the following.

1. $\mathbb{E}[XY] = \dfrac{13}{9}$.

2. Y has uniform distribution.

Use this information to fill in the missing values of the joint probability mass function table.

Problem 2

A deck of 52 cards is shuffled and dealt. Find the probabilities of the following events:

1. The tenth card is a queen.

2. The twentieth card is a spade.

3. The last five cards are spades.

4. The last king appears on the 48th card.

Ex 3.6.2 in Pitman's Probability

Problem 3

Suppose n balls are thrown independently at random into b boxes. Let X be the number of boxes left empty. Use the method of indicators to find expressions for $E[X]$ and $Var(X)$.
Ex 3.6.5 in Pitman's Probability