Quiz 3

Form A Name _____

Math 130B, 5 PM

Please justify all your answers April 13, 2022

Please also write your full name on the back

1. Let X and Y be two jointly continuous random variables with joint probability density function given by

$$f_{X,Y}(x,y) = \begin{cases} 1 + cxy, & \text{if } 0 \le x \le 1,\ 0 \le y \le 2x \\ 0, & \text{otherwise} \end{cases}.$$

   (a) Find the constant c.

   (b) Are the variables X and Y independent?

Quiz 5

Form B Name _____

Math 130B, 6 PM

Please justify all your answers May 4, 2022

Please also write your full name on the back

1. Suppose you have n bins and you throw m balls at them. Assume that each ball is equally likely to fall into each bin.

   (a) What is the expected number of balls in each bin?

   (b) What is the expected number of bins with exactly one ball in them?

2. Let X and Y be random variables with joint probability mass function given by

$$p(0,0) = 1/10, \quad p(1,0) = 1/2, \quad p(0,1) = 3/10, \quad p(1,1) = 1/10.$$

   Calculate $\mathrm{Cov}(X, Y)$.