

Math 477, Homework 7

Name: \_\_\_\_\_

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1. Suppose that  $X$  and  $Y$  are jointly continuous random variables with joint density function  $f_{X,Y}(x, y) = \frac{1}{y}$  for  $0 < y < 1$  and  $0 < x < y$  and  $f_{X,Y}(x, y) = 0$  otherwise.

(a) Find  $E[XY]$

(b) Find  $E[X]$

(c) Find  $E[Y]$

2. How many times would you expect to roll a fair die until each number comes up at least once?

3. Let  $X$  and  $Y$  be independent random variables, uniformly distributed on the interval  $[0, 2]$ .

Find  $E[\max\{X, Y\}]$ .

4. Suppose two people both independently choose 3 random numbers from the set  $\{1, \dots, 10\}$ . Let  $X$  represent how many numbers they have chosen in common. What is the expected value of  $X$ ?