Math 407, Quiz 2

10 am on Wed. Mar. 31 until 10 am on Thu. Apr. 1

You may use a calculator (without internet connection or other communication capabilities). You are allowed to look at the textbook, or at the lecture notes from class. However no other sources (for example the internet) are allowed. TO GET FULL CREDIT, WORK MUST ME SHOWN. Upload your solutions to blackboard as a pdf file.

1. Suppose that the amount of time one spends in a barber shop is exponential with mean 8 minutes.

a) What is the probability that a customer will spend more than 14 minutes in the barber shop ?

b) What is the probability that a customer will spend more than 14 minutes in the barber shop given that he is still in the barber shop after 10 minutes ?

2. A random variable M is uniformly distributed on $\{1, 2, \cdots, 8\}$. Let X be the indicator of the event $(M \leq 5)$ and let Y be the indicator of the event (M is even).

a) Find $E(X)$ and $E(Y)$.

b) Are X and Y independent ?

c) Find $Cov(X, Y)$.

3. Let X be a random variable with density function

$$f(x) = \frac{1}{\pi(1+x^2)} \ , \ -\infty < x < \infty.$$

Find the density function of the random variable $1/X$.