quiz # 1

Exercise 1 *(2 points)*

a. in how many ways can 15 students be assigned to 3 classes of size 5 each, if Asma and Maya, two of the 15 students, must be in the same class room?

b. let A and B be two events such that $P(A) > P(B) > 0$. Show that $P(A|B) > P(B|A)$.

Exercise 2 *(5 points)* An urn contains 12 balls, of which 4 are white. Three players A, B and C successively draw ball from the urn, A first, then B, then C, then A and so on. The winner is the first one to draw a white ball. What is the probability that A win the game if the draw is:

a. without replacement

b. with replacement

Exercise 3 *(4 points)* An urn contains b black balls and r red balls. One of the balls is drawn at random, but when it is put back in the urn, c additional balls of the same color are put in with it. A ball is then selected form the urn, what's the probability that the first ball was black given that the second ball drawn was red?

Exercise 4 *(4 points)* A fair coin is tossed until three heads or three tails have been obtained. Let X denote the number of tosses that are required. Find the pdf of X. Find the mgf of X, and use it to find $E(X)$.

Exercise 5 *(5 points)* Two players A and B play a series of independent games. The probability that A wins a game is 1/3. The first player who win 3 games is declared the winner.

a. what's the probability that the series ends in 4 games ?

b. if A wins the first game, what's the probability that B is the winner?