Ecs 132 Homework 2

Problem 0:

You are playing a game at a carnival, the game involves rolling a 3 sided dice where: Rolling a

1 has probability of $\frac{2}{10}$

2 has probability of ___ <FILL IN THE ANSWER>

4 has probability of $\frac{3}{10}$

If you land on the dice face **2**, you get to flip a fair coin otherwise you will flip an unfair coin such that P(Tails)=.30 Let X be a random variable that represents the number of dots you see on a face of the dice, and Y be an indicator variable on whether the coin shows a head when flipped.

Find var(X+4Y)analytically and confirm via simulation.

Problem 1:

1. Consider the bus ridership example. Intuitively, L_1 and L_2 are not independent, show that var(L1-L2)does not equal Var(L1)+ var(L2). Determine the difference. (Find the three variances analytically, **and confirm via simulation.)**

Problem 2:

The game is to toss a coin until we get **r** consecutive heads or reach a total of **s** tosses, whichever comes first.

Let X denote the number of tosses we make. We win $X. Find the minimum fee that should be charged for this game if r = 4 and s = 7. **Confirm via simulation.**

Problem 3

Let X and Y be indicator random variables such that P(X = 1), P(Y = 1) and P(X = Y = 1) are p, q and r, respectively. Find Var(3X-2Y), as a function of p, q and r. **NO SIMULATION**

Problem 4:

Let X be a random variable that denotes the sum of the values on a roll of 2 dice(**8 sided dice** with equal prob of getting any face (1-7)).

1. What values does the random variable take?
2. Find the pmf.
3. What is the expected value of X? Confirm via simulation.
4.) What is the variance ?