

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 $P(\text{Tails}) = .30$. 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 $\text{var}(X+Y)$ analytically and confirm via simulation.

Problem 1:

1. Consider the bus ridership example. Intuitively, L_1 and L_2 are not independent, show that $\text{var}(L_1 - L_2)$ does not equal $\text{Var}(L_1) + \text{var}(L_2)$. 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 $\text{Var}(3X-2Y)$, 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 ?