

CS 1050B: Constructing Proofs

Problem Set 6

Due Wednesday, Nov 3rd, after the class

1. Rosen 6.1: 36

Rolling dice:

- What is the total number of possible outcomes of the roll of two dice? and three dice?
- How many ways are there to get a total of 8 when two dice are rolled. How many if three dice are rolled?
- Which is more likely: rolling a total of 8 when two dice are rolled or rolling a total of 8 when three dice are rolled?

2. Rosen 6.3: 14

Suppose that E , F_1 , F_2 , F_3 are events from a sample space S and that F_1 , F_2 , and F_3 are mutually disjoint and their union is S . Find $p(F_2|E)$ if $p(E|F_1) = 2/7$, $p(E|F_2) = 3/8$, $p(E|F_3) = 1/2$, $p(F_1) = 1/6$, $p(F_2) = 1/2$, and $p(F_3) = 1/3$.

3. Rosen 6.4: 26

Provide an example that shows the variance of the sum of two random variables is not necessarily equal to the sum of their variances when the random variables are not independent. (Please show the variance of both random variables, respectively and the variance of the sum.)

4. Rosen 6.4: 30

Use Chebyshev's Inequality to find an upper bound on the probability that the number of tails that come up when a biased coin (with probability of heads equal to 0.6) is tossed n times deviates from the mean by more than \sqrt{n} .