

Problem Set 9

Due: Wednesday April 23, 2008

Note: We will refer to the text as [YG].

Readings: Course Notes for Lectures 17-20 and corresponding parts of [YG] Chapters 9, 6, and 7.

Problem 1: [YG] Problem 9.1.2

Problem 2: [YG] Problem 9.2.5

Problem 3: [YG] Problem 6.6.2

Problem 4

Each day, Mercutio puts some pennies into his piggy-bank. The number of pennies he adds is equally likely to be 1, 2, 3, 4, 5, or 6. Assuming he never takes out any money, find the probability that it takes him at least 80 days to collect 3 dollars.

Problem 5

Suppose your winnings in a round of a card game are described by a random variable with mean 0, and variance \$1. Find the probability that after 10 rounds of the game, your total gain is at least \$5.

Problem 6

Consider 10 i.i.d., uniform[0,1] random variables, X_1, \dots, X_{10} .

- (a) Estimate $P(X_1 + \dots + X_{10} \geq 7)$ using the Markov inequality.
- (b) Repeat part (a) using the Chebychev inequality.
- (c) Repeat part (a) using the Central Limit Theorem.

Problem 7: [YG] Problem 6.9.2

Problem 8: [YG] Problem 7.1.2