Due by 5:00pm on Friday, February 23, 2007. You may turn in during class Wed, or get the paper to Joe’s office (Math 1-109) or mailbox by 5pm Friday.

Reminder: For full credit, you must show your reasoning!

Recommended Reading: Ross, Chapter 4, Sections 4-1 through 4-4, Section 4.5.1, Section 4.6.

Note: All problem numbers refer to the text, Ross, Ninth Edition. (If you use an earlier edition of the text, you will have to determine the correct problems to do.)

(1). (20 points) Each morning Joe leaves his house and goes for a run. He is equally likely to leave either from his front or back door. Upon leaving the house, he chooses a pair of running shoes (or goes running barefoot if there are no shoes at the door from which he departed). On his return, he is equally likely to enter, and leave his running shoes, either by the front or back door. Assume that he owns a total of \( k \) pairs of running shoes.

(a). Model this process as a Markov chain.

(b). What proportion of the time does Joe run barefooted?

(2). (20 points) # 30, Chapter 4. Three out of every four trucks on the road are followed by a car, while only one out of every five cars is followed by a truck. What fraction of vehicles on the road are trucks? (Show your work! Describe the Markov chain model, define the states, give the transition matrix, etc.)

(3). (20 points) # 34, Chapter 4. (Assume that the vertices of the triangle are indexed in clockwise order around the triangle, so that vertex 2 is clockwise of vertex 1, etc.)

(4). (20 points) # 46, Chapter 4.

(5). (20 points) # 61, Chapter 4.