AMSC/CMSC 660 Quiz 2 , Fall 2010

Show all work. You may leave arithmetic expressions in any form that a calculator could evaluate. By putting your name on this paper, you agree to abide by the university's code of academic integrity in completing the quiz. Use no books, calculators, cellphones, other electronic devices, communication with others, scratchpaper, etc.

Name _____

1. (10) Write MATLAB code using `rand` (which generates a uniformly distributed random number between 0 and 1) to generate a random number from the following distribution:

> The probability that the number is 0 is 0.3.
> The probability that the number is 1 is 0.7.

(In other words, if $p(x)$ is the probability density function, then $p(0) = 0.3$ and $p(1) = 0.7$.)

2. Let

$$\boldsymbol{M} = \begin{bmatrix} 0.3 & 0 & 0.4 & 0.1 \\ 0 & 0 & 0.2 & 0 \\ 0.7 & 0.5 & 0 & 0.9 \\ 0 & 0.5 & 0.4 & 0 \end{bmatrix}$$

be the transition matrix for a Markov chain: m_{ij} is the probability of transitioning to the ith state from the jth state.

2a. (5) Draw the Markov chain. Label each edge with the probability of making that transition.

2b. (5) If we begin in the first state of the Markov chain, what is the probability of being in the third state after 2 steps? (For the epidemic model, a step corresponded to a day.)