FINAL EXAM

STA 214
4/23/1998.

Name ______________________________

ID number ______________________________

Notes:

1. This is an open book and open notes exam.
2. You must show your work and/or explain your answer in order to receive credit.
3. The exam has 4 problems and carries 100 points.

Problem	1	2	3	4	Total
Score					

1. From purchase to purchase, a particular customer switches brands among products A, B, and C according to a Markov chain whose transition probability matrix is

$$\mathbb{P} = \begin{bmatrix} 0.6 & 0.2 & 0.2 \\ 0.1 & 0.7 & 0.2 \\ 0.1 & 0.1 & 0.8 \end{bmatrix}$$

In the long run, what fraction of time does this customer purchase brand A.

2. A radioactive source emits particles according to a Poisson process with rate $\lambda = 2$ particles per minute.

(a) What is the probability that the first particle appears some time after three minutes but before five minutes?

(b) What is the probability that exactly one particle is emitted in the interval from three to five minutes?

(c) If it is known that up to five minutes 4 particles have been emitted, what is the probability that up to 3 minutes more than two particles have been emitted?

3. Consider the triangular life time density $f(t) = 2t$, for $0 < t < 1$. What is, approximately, expected number of renewals up to time T.

4. (i) Describe a problem and construct the data for which a GLM model with the *logit* link would be appropriate.

(ii) Write down the Nadaraya-Watson regression estimator for normal kernel with $\sigma = 2$, if (X_i, Y_i): (1,2), (2, 4), (4, 9) and (6, 14) have been observed.