# MA 587/687

Name (Print last name first): .....

## Quiz 6

Question 1

A Markov chain has transition matrix

$$P = \begin{bmatrix} 0 & 1 & 0 \\ 1/2 & 1/4 & 1/4 \\ 1/4 & 1/2 & 1/4 \end{bmatrix}$$

Use one step analysis to find the mean time $m_{10}$ for going from state 1 to state 0. Using this, find the value of $m_{00}$, the mean return from state 0 to state 0.

Question 2

Suppose $X_n$ is a branching process with offspring distribution $\xi$ which has a Geometric($c$) distribution $p_k = ck(1-c), 0 < c < 1$. If $X_0 = 1$, what is the probability that the branching process goes extinct by time 2? In other words what is $P(X_2 = 0)$?