Mathematics 171 − HW3 − Due Thursday, April 21, 2011.

Problems 10,12,18,24,31,32 on pages 90-95, plus the following:

E. Consider independent tosses of a fair die. Let $Z_n \in \{1, 2, 3, 4, 5, 6\}$ be the result of the nth toss, and $X_{n+1} = \max(X_n, Z_n)$.
  (a) What is the transition matrix for this Markov chain?
  (b) Which states are transient, and which are recurrent?
  (c) For each transient x and recurrent y, find $E_x T_y$, where T_y is the hitting time of y.

F. (a) Suppose $S = \{0, 1, 2, \ldots \}$, and for $n \geq 0$,

$$p(n, n + 1) = \frac{n + 1}{n + 3}, \quad p(n, 0) = \frac{2}{n + 3}.$$

Find the stationary distribution for this chain.
  (b) What happens if the transition probabilities are

$$p(n, n + 1) = \frac{n + 1}{n + 2}, \quad p(n, 0) = \frac{1}{n + 2}$$

instead?