

HW 4 Math 468/568

Due in the beginning of class Tuesday, March 1, 2016.

1. Consider a Markov chain (from HW3) on the non-negative integers such that starting from  $x$ , the chain goes to state  $x + 1$  with probability  $p$ , for  $0 < p < 1$ , and goes to state 0 with probability  $1 - p$ .

Find the stationary distribution(s) of the chain, if they exist.

2. For the Birth-Death chain on  $\mathbb{Z}$  where  $p_x = 1/5$  and  $q_x = 4/5$  for all  $x \in \mathbb{Z}$ , find  $\rho_{0,0}$ .  
Hint: Write in terms of Birth-Death chains on the half lines.

3. Durrett 1.36

4. (Graduates) Durrett 1.59