

**Tutorial/Recitation 9: Solutions**

1. Problem 7.1, page 380 in textbook. See online solutions.
  2. (a) Recurrent: 1, 2, 4, 5, 6; Transient: 3; Periodic: 4,5,6.  
(b)  $0.2^n$   
(c) This is a geometric random variable with parameter  $p = 0.5 + 0.3$ . Hence, the expected number of trials up to and including the trial on which the process leaves state 3 is  $\mathbf{E}[X] = 1/p = 5/4$ .  
(d)  $3/8$   
(e)  $\mathbf{P}(A) = 0.3 + 0.2^3 0.3 + 0.2^6 0.3 + 0.2^9 0.3 = 0.3024$ .  
(f)  $0.3/\mathbf{P}(A) = 0.992$ .
  3. Problem 7.13, page 385 in textbook. See online solutions.
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6.041 / 6.431 Probabilistic Systems Analysis and Applied Probability  
Fall 2010

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