

## C: ANSWERS TO SELECTED PROBLEMS

### Chapter 9.1, Transition Matrices

1.  $\begin{bmatrix} 0.6 & 0.4 \\ 0.3 & 0.7 \end{bmatrix}$       3. 44.4%.
5. 42.9% Taylor's; 57.1% Sower's.      7. Is a transition matrix.
9. Not a transition matrix, the sum of the elements in last row is not 1.
11. [a] [0.48 0.52], [b] [0.392 0.608].      13.  $\begin{matrix} \text{I} & \text{II} \\ \begin{bmatrix} 0.5 & 0.5 \\ 0.4 & 0.6 \end{bmatrix}; 55\%. \end{matrix}$
15.  $\begin{matrix} B & J & R \\ \begin{bmatrix} 0.5 & 0.2 & 0.3 \\ 0.4 & 0.4 & 0.2 \\ 0.3 & 0.1 & 0.6 \end{bmatrix}, \text{Approximately } 40\%. \end{matrix}$       17. 64%.
19. 25%.      21. 49.6%.
23.  $P_2 = [0.36 \ 0.16 \ 0.48]$ ;  $P_4 = [0.48 \ 0.25 \ 0.27]$ .
25.  $[\frac{16}{90} \ \frac{27}{90} \ \frac{47}{90}]$ ;  $[\frac{158}{675} \ \frac{141}{675} \ \frac{376}{675}]$ ; 20%.      27. 8.5%.
29. No.

### Chapter 9.2, Regular Markov Chains

1. Yes.      3. No.
5. No.      7. No.
9. Yes.      11.  $[\frac{20}{47} \ \frac{14}{47} \ \frac{13}{47}]$ .
13. [a] Yes, [b] No, [c] No.      15.  $[\frac{4}{7} \ \frac{3}{7}]$ .
17. [a] Yes  $[\frac{1}{3} \ \frac{2}{3}]$ , [b] No, [c] No.
19. [a] Yes  $[\frac{3}{11} \ \frac{5}{11} \ \frac{3}{11}]$ , [b] No, [c] Yes  $[\frac{1}{8} \ \frac{3}{8} \ \frac{3}{8} \ \frac{1}{8}]$ .
21. 44%.      23.  $[\frac{30}{67} \ \frac{21}{67} \ \frac{16}{67}]$ .
25. 58%.      27.  $\frac{43}{91}$ .

### Chapter 9.3, Absorbing Markov Chains

1. State 4.      3. Yes.
5. No.      7.  $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0.4 & 0.6 & 0 \end{bmatrix}$ , 40%, 60%, 0%.
9. [a] 0, [b] approximately 18.      11. [a] States 1 and 2; Yes, [b] None; No.
13. [a] State 3; Yes, [b] States 2 and 4; Yes.      15. 47%.
17. 6%; 99%.      19. 67%.
21. 4 times.      23. 60%.

### Chapter 9.4, Chapter Review

1. None.      3. None.
5. Irreducible.      7.  $[0.25 \ 0.50 \ 0.25]$ .
9.  $\begin{bmatrix} 0 & 1 & 0 \\ 0 & 1 & 0 \\ 0 & 1 & 0 \end{bmatrix}$ .      11. [a]  $\begin{matrix} W \\ D \end{matrix} \begin{bmatrix} 0.6 & 0.4 \\ 0.13 & 0.87 \end{bmatrix}$ , [b] ~78%, [c] ~75%.

13. 
$$\begin{matrix} 1 & \left[ \begin{matrix} \frac{1}{3} & \frac{1}{3} & \frac{1}{3} \end{matrix} \right] \\ \text{[a]} & 2 & \left[ \begin{matrix} \frac{1}{3} & \frac{1}{3} & \frac{1}{3} \end{matrix} \right], \text{ [b] } \sim 30\%, \text{ [c] } 0. \\ 3 & \left[ \begin{matrix} 0 & 0 & 1 \end{matrix} \right] \end{matrix}$$

15. 2.