

Math 317: Practice Problems for Quiz 2

Problems From Textbook:

Edition 4:

Section 17: 17.1, 17.3

Section 21: 21.1, 21.2(i)

Section 29: 29.4

Edition 5:

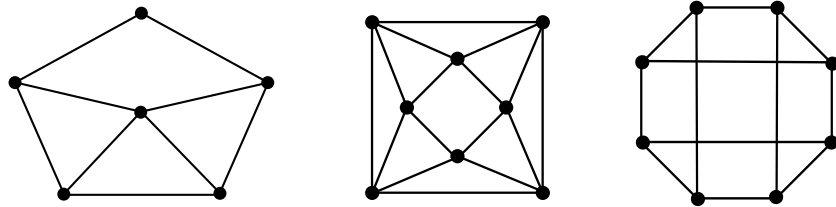
Section 5.1: 5.1, 5.3

Section 5.2: 5.9, 5.11(i)

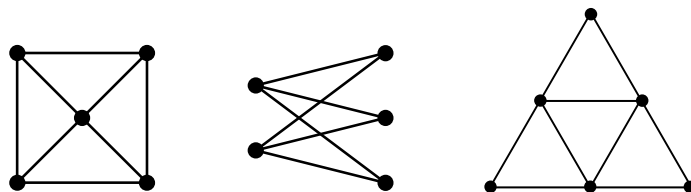
Section 6.3: 6.21

Additional Problems:

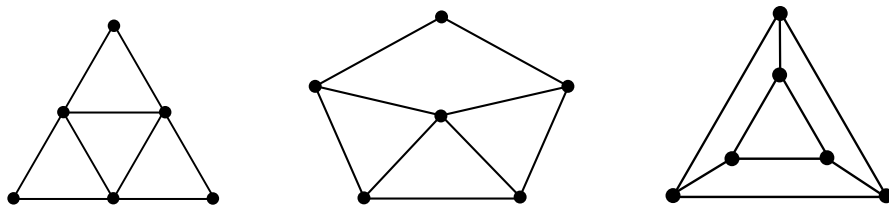
- For each of the following graphs, compute the chromatic number $\chi(G)$ of the graph, and show a coloring that uses the minimum number of colors.



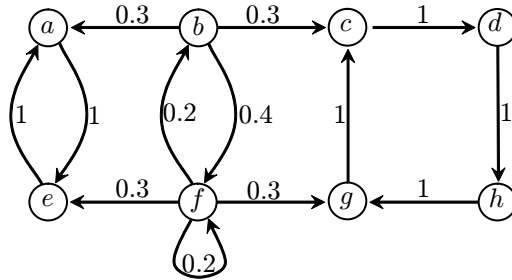
- For each of the following graphs, compute the chromatic index $\chi'(G)$ of the graph, and show an edge-coloring that uses the minimum number of colors.



- For each of the following graphs, compute the chromatic polynomial $P_G(k)$.

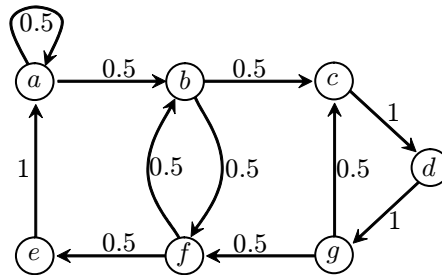


4. Consider the following Markov chain



- Which states in the Markov chain are persistent? Which states are transient?
- For each state of the Markov chain, determine whether the state is periodic. If it is periodic, what is its period?
- Is the Markov chain ergodic?

5. Consider the following Markov chains:

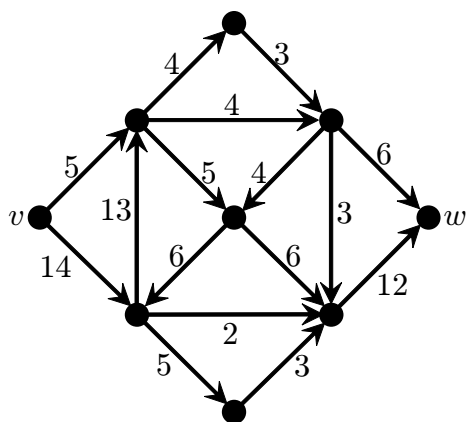


- Which states in the Markov chain are persistent? Which states are transient?
- For each state of the Markov chain, determine whether the state is periodic. If it is periodic, what is its period?
- Is the Markov chain ergodic?

6. There are two competing cellphone companies in a city, Company A and Company B. In 2012, 40% of the people in the city use Company A, and 60% of the people use Company B. Each year 40% of the people who use Company A switch to using Company B, and 30% of the people who use Company B switch to using Company A. (Assume that everyone in the city has a cellphone with either Company A or Company B.)

- Model this situation with a Markov chain. Find the transition matrix and associated digraph that describes the number of people using each company.
- What percent of people will use Company A in 2013?
- Assuming the trend continues, what fraction of people will use Company A in the long run?

7. Consider the following network:



- (a) Find a maximum flow in the above network.
- (b) Find a minimum cut in the above network.