Math 314 Section 2: Exam 2 Review

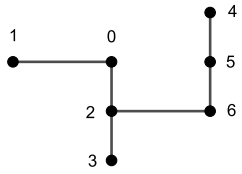
Disclaimer: The content for Exam 2 is everything we covered in class (including quizzes) from chapters 7, 8, 9, 10, 12, and 13. Note that there were a few things covered in class that are *not* mentioned in the book. If you missed these classes, make sure you find out what you missed. In addition to the review problems, you should look at homework problems, quizzes, and the problems in the textbook. In general, the problems on the exam will be *similar* to the review/homework/textbook/etc. There will be things on the exam that are not included in this review sheet and vice versa.

Questions to ask yourself:

1. Do you know all of the important definitions?
2. Can you state all of the important theorems? Can you apply them to solve a problem?
3. Are there any homework/quiz/textbook problems that you do not understand?
4. Are you missing any material from a class absence?

Practice Questions:

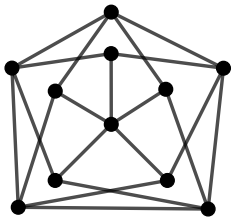
1. Consider the following labeled tree T:



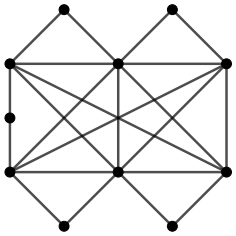
   Find the Prüfer code for T. Can you reconstruct T from the Prüfer code?

2. Find the Planar code for T (above) using 0 as the root vertex. Can you reconstruct T from the planar code?
3. Find every unlabeled tree on 5 nodes. How about 6 nodes?

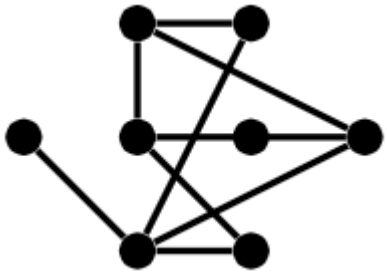
4. Find the chromatic number for this graph:



5. Is the following graph planar? Why or why not? Whats the chromatic number?



6. Calculate the chromatic polynomial of C_4 with a single leaf attached.
7. Write down every graph property you can think of that is possessed by this graph:



8. Does there exist a graph on n vertices with degrees $1, 2, ..., n$? How about $0, 1, ..., (n-1)$? How about $2, 2, ..., 2$?
9. Suppose you have a connected planar graph where the sum of the vertex degrees is equal to 6 times the number of faces. Find a formula for the number of vertices in terms of the number of edges.

10. Suppose you have a disconnected planar graph with 2 connected components. Suppose the graph is 6-regular and has 27 edges. How many faces does it have? Followup question: is it even possible to have such a graph?

11. Prove that every connected planar bipartite graph has a vertex of degree less than 4.