

WRITTEN ASSIGNMENT # 9

MATH 38

DUE: MONDAY 25, 2005

Read Section 2.2

1. Is it true that every graph with less edges than vertices must contain a component that is a tree? Explain.
2. Give an example of a tree with center isomorphic to K_1 and one tree with center K_2 .
3. Is it possible for the center of a simple graph to be a disconnected graph? Give an example of a graph with disconnected center if possible or explain why you think this is not the case.
4. Why are there $2^{\binom{n}{2}}$ simple graphs with vertex set $[n]$?
5. Under the Prüfer code what sequence corresponds to the star $K_{1,n-1}$ where the middle vertex is labeled 3?
6. Choose your favorite labeling of the path P_7 and compute its Prüfer code.
7. Let $(1, 2, 3, 4, 5)$. What labeled tree corresponds to this sequence?
8. What is a contraction of an edge e in a graph G ? Choose a simple graph with 6 vertices and 9 edges and illustrate this definition by contracting one of the edges of your graph.
9. According to Proposition 2.2.8, how does contracting an edge help us in finding $\tau(G)$?
10. How is Proposition 2.2.8 proved?
11. State the Matrix tree theorem and use it to compute the number of spanning trees in the simple graph in Exercise 2.2.2.
12. Verify Conjecture 2.2.15 for trees of order up to $n = 6$. Can you think of a graceful labeling for $K_{1,n-1}$ in general?