Last name ______________________

First name ______________________

LARSON—MATH 356—CLASSROOM WORKSHEET 09
Trees!

Reminders

1. Remember to email your Notes/Classroom Worksheet prior to the next class.
2. Read ahead in our textbook. We're into Chp. 2 and trees!

Concepts & Notation

- Sec. 1.8: weighted graph, shortest path problem, Dijkstra's algorithm.
- Sec. 2.1: acyclic, tree
- Sec. 2.2: cut edge, spanning tree.

- Sec. 2.3: cut vertex, Prufer code, coding and decoding algorithm, Cayley's Theorem.

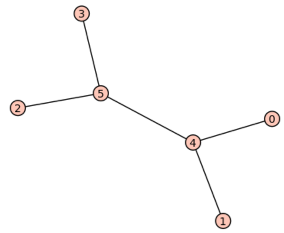
Review

1. What is a *tree*?

2. **Claim**: Any two vertices in a tree are connected by a unique path.

3. **Corollary:** A tree with at least two vertices has a vertex of degree 1 (called a *leaf* or a *pendant*).

Notes



1. **Corollary:** If T is a tree and v is a leaf, then the graph $T - v$ (technically $T[V(T) \setminus \{v\}]$, formed by deleting vertex v and its single incident edge) is a tree.

2. What is *proof by induction*?

3. **Claim**: For any tree, $\epsilon = \nu - 1$.

4. What is a *cut edge*?

5. **Claim**: A connected graph is a tree if and only if every edge is a cut edge.

6. What is *mathematical induction*?

7. How does mathematical induction work in graph theory?

8. **Claim**: For any tree, $\epsilon = \nu - 1$.

9. What is a *cut edge*?

10. **Claim**: A connected graph is a tree if and only if every edge is a cut edge.

11. What is a *spanning tree*?

12. **Claim**: A connected graph has a spanning tree.

13. **Claim**: If a graph is connected then $\epsilon \geq \nu - 1$.

14. How can we *find* a spanning tree in a connected graph?