Last name _____

First name _____

LARSON—MATH 356—CLASSROOM WORKSHEET 10
Kruskal's algorithm!

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. After Kruskal's algorithm, we will discuss Prufer codes.

Concepts & Notation

- Sec. 2.2: cut edge, spanning tree.

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

Review

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, $\epsilon = \nu - 1$.

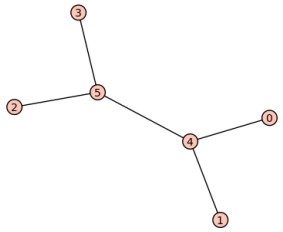
4. How does mathematical induction work in graph theory?

5. What is a *cut edge*?

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

7. What is a *spanning tree*?

Notes



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

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

3. What is a *minimum weight* spanning tree?

4. How can we *find* a minimum weight spanning tree in a connected graph?

5. What is Kruskal's Algorithm?

6. Prove Kruskal's algorithm produces a minimum weight spanning tree.

7. (**Kruskal Lemma**). If T is a tree with non incident vertices v and w then $T + vw$ has a unique cycle.

8. (**Kruskal Lemma**). If C is a subgraph of G that is a cycle, then no edge of C is a cut edge of G.

9. (**Kruskal Lemma**). If a graph G of order ν is connected and has $\nu - 1$ edges then G is a tree.