**Last name** _____

**First name** _____

## LARSON—MATH 356—CLASSROOM WORKSHEET 08
## Trees!

### Reminders

1. Remember to email your Notes/Classroom Worksheet prior to the next class.
2. Homework $h03$ is due today.
3. Homework $h04$ is the Test Review. That's due Mon., Mar. 22 11:59 pm.
4. Test 1 is Tuesday, Mar. 23.
5. 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.

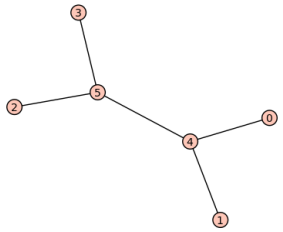
### Review

1. (Sec. 1.8) What is a *weighted graph*?

2. What is the *shortest path problem*?

3. What is *Dijkstra's algorithm*?

**Notes**




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*).

4. **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.

5. What is *proof by induction*?

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

7. What is a *cut edge*?

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