

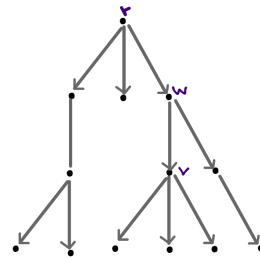
MATH 363 Discrete Mathematics

Assignment 12

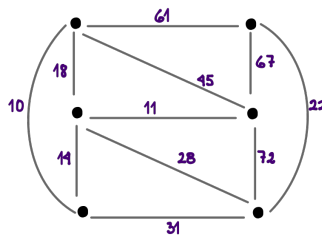
Due by April 14th

1. (1pt each) Consider the following rooted tree T :

- i*) How many children has vertex v ?
- ii*) Draw the subtree of vertex w .
- iii*) What is the depth of vertex v ?
- iv*) What is the height of the tree?
- v*) Who is the parent of w ?



2. (1pt) Give an example of a 3-ary tree which is not a full 3-ary tree.
3. (2pt) What is the number of connected components in a forest with n vertices and m edges?
4. (2pt) Prove that trees are bipartite.
5. (2pt) A chain letter starts when a person sends a letter to five others. Each person who receives the letter either sends it to five other people who have never received it or does not send it to anyone. Suppose that 10,000 people send out the letter before the chain ends and that no one receives more than one letter. How many people receive the letter, and how many do not send it out?
6. Consider the following graph G with edge weights as indicated below.



- i*) (3pt) Apply Kruskal's algorithm to G . Show all the steps of the algorithm.
- ii*) (3pt) Apply Prim's algorithm to G . Show all the steps of the algorithm.

7. (**3pt** each) Choose two of the following type of trees, and write a short introduction about them: definition, motivation and examples: Binary Search Trees, Decision trees, Game trees.