

## Problem Set 19

Due: Thursday, April 30th

**Instructions:** Answer each of the following questions and provide a justification for your answer.

1. Suppose  $G$  is a connected graph with  $n$  vertices. Prove that if  $G$  has  $n - 1$  edges then removing any edges disconnects  $G$ .
2. Suppose that  $G$  is a connected graph and an edge  $e$  of  $G$  is contained in every spanning tree of  $G$ . Prove that removing  $e$  makes  $G$  disconnected.
3. Prove that every tree with more than one vertex has at least two vertices of degree 1.
4. Pat yourself on the back. You did it.