Homework 8

Worked with: _____

Consulted: _____

#1. Show the following are decidable or undecidable

    a) L = { (M,w) | M is a dfa and on input *w* visits each one of its states}
    b) L = { (M,w) | M is a TM and on input *w* makes an odd number of transitions}
    c) L= { n | n is prime}

#2. Given 2 dfa's M1 and M2, Consider the question EQ$_{dfa}$: "Is L(M1) = L(M2)?"

    a) **State this as a language problem**
    b) **Show EQ$_{dfa}$ is decidable or undecidable**

#3. Prove or disprove: Given a grammar in CNF and a string w ε L(G) with derivation tree T, *if depth(T) = n, then |w| $\leq$ 2n-1*

#4. Given an arbitrary turing machine, M, and an arbitrary state q e M, show that it is undecidable whether M ever enters state q. Do not use Rice's Theorem.

#5. A property, P, of re languages is a mapping:

P: {re languages over S*} $\rightarrow$ {T,F}

A property P is *trivial* if it is true of *all* re languages or *no* re language

    a) **Name a non-trivial property of re languages**
    b) **Name a trivial property of re languages**

(Note: You may research this: just say where you got your answer from)