

Problem 1(2+3+2pts): Follow the below steps, show that this problem is in NP:

Given a graph with n nodes and a number k , are there k nodes that form a clique? (vertices in a clique are all connected to each other)

Part(A): Construct the verifier.

Part(B): Briefly explain how your verifier works.

Part(C): Show that the verifier works in polynomial time.

Problem 2(8pts): Reduction

For the below problem, choose an NP-complete problem A and for any A instance, construct an instance of the below problem. **You need to ensure the yes/no answers to the two instances are the same, but you do not need to prove it.**

We have learned 3-coloring problem in class. Now consider this problem: Given an undirected graph G , can the nodes be colored in 5 colors so that no adjacent nodes have the same color? Please reduce 3-coloring problem to 5-coloring problem.