Some Problems

An instance of k-colouring consists of a graph G=(V,E).We are to determine if there is a mapping f from V to {1,…,k} such that if uv is in E then f(u) is not equal to f(v).

An instance of 3-SAT is an instance of SAT in which all the clauses have 3 literals.

(1) Show how to reduce k-Colourability to Satisfiability.
(2) Show how to reduce Satisfiability to 3-SAT.

An instance of IS THIS A SUM_n consists of a string $a_1,…,a_n$ of 0s,1s and 2s. We want to determine if there are precisely 2 2s in the string and for some integers X and Y, the string is X in binary followed by a 2 followed by Y in binary, followed by a 2 followed by X +Y in binary

3) Show how to reduce IS THIS A SUM_n to an instance of Satisfiability.

4) Sketch how you might reduce Knapsack to Satisfiability.

5) Show how to reduce fractional matching to fractional matching on bipartite graphs.