2. ISO = $\{\langle G, H\rangle |$ G and H are graphs isomorphic to one another.$\}$ Show that ISO $\in$ NP.

   Lets assume there is a TM M for ISO

   M = "on input $\langle$G, H $\rangle$where G and H are undirected graphs.

   1. Nondeterministically select a permutation of nodes
      2. for each pair of nodes x and y check to see if (x,y) is an edge in G
         3. If there is an edge, check for an edge (x, y) in H. If not reject.
   4. accept.

   step 1 All we are doing is selecting elements which runs in NP.

   Step 2 in NP because we will do $O(n^2)$ work checking every node against every other node.

   Step 3 is based on step two, and step 3 runs in $O(n^{2)}$ so it would be c * $O(n^{2)}$ * $O(n^{2)}$ which is still polynomial therefore $\in$ NP.

   Step 4 accepts in O(1).

   Therefore our highest order is $\in$ NP so this construction must be $\in$ NP.

   This construction is correct because we will check that every single edge from G is in H ensuring that every node leads to the proper node in both of the graphs, and through the above proof we know we can do this is polynomial time with a nondeterminism.