

Prove that each of the following problems is NP-hard.

1. Given an undirected graph  $G$ , does  $G$  contain a simple path that visits all but 374 vertices?
2. Given an undirected graph  $G$ , does  $G$  have a spanning tree in which every node has degree at most 374?
3. Given an undirected graph  $G$ , does  $G$  have a spanning tree with at most 374 leaves?