1. Suppose $G = (V, E)$ is an undirected graph with at least 2 vertices. For each $v \in V$, let $\deg(v)$ denote the degree of $v$, i.e., the number of edges incident on $v$.

(a) Prove that
\[ \sum_{v \in V} \deg(v) = 2 \cdot |E|, \]

$|E|$ denotes the cardinality of $E$, i.e., the number of edges in the graph.

(b) Prove that $G$ contains an even number of vertices of odd degree.

(c) Prove that $G$ contains at least two vertices that have the same degree.