1. Prove by contradiction: Prove a graph with 45 edges and 24 vertices has a vertex of degree at most 3.

2. Given $a_0 = 2$, $a_1 = 0$ and $a_n = 5a_{n-1} - 6a_{n-2}$ for $n \geq 2$, prove by induction, for each integer $n \geq 0$, $a_n = 6 \cdot 2^n - 4 \cdot 3^n$. 