1. (25 Marks) Prove that $n^2 \geq 4n + 5$ for all integer $n \geq 5$. 
2. (25 Marks) Let \( \{a_n\} \) be a sequence of natural numbers such that \( a_1 = 5 \), \( a_2 = 13 \) and \( a_{n+2} = 5a_{n+1} - 6a_n \) for all natural numbers \( n \). Prove that \( a_n = 2^n + 3^n \) for all natural number \( n \) (that is for all integer \( n \geq 1 \)).