1. Suppose f is holomorphic on a nonempty open set $U$. Show that one of these statements is true: (a) f is a polynomial. (b) There is a $z \in U$ such that $f^{(n)}(z) \neq 0$ for all $n$. 
2. Let \( f \) be an entire function such that \( |f(z)| \leq K|z|^n \) where \( K \) is a positive real constant and \( n \) is a positive integer. Show that \( I \) is a polynomial of degree at most \( n \).
3. Suppose $f$ and $g$ are two entire functions such that $|f(z)| \leq |g(z)|$ for all $z \in \mathbb{C}$. What is the relationship between $f$ and $g$?