1. Use the generating function \( \prod_{j \geq 0} (1 + x^{2^j})^{-1} \) to show that for \( n \geq 2 \), the number of partitions of \( n \) into powers of 2 is even.

[Example: for \( n = 4 \), the relevant partitions are 4, 22, 211 and 1111.]

2. Let \( p'(n) \) (resp. \( p''(n) \)) be the number of partitions of \( n \) into an even (resp. odd) number of parts, and \( t(n) \) the number of partitions of \( n \) into distinct odd parts. Show \( |p'(n) - p''(n)| = t(n) \).