$g(n)/f(n) = 1/(a_m + a_{m-1}/n + a_{m-2}/n^2 + \cdots + a_0/n^m)$. So $\lim_{n \to \infty} g(n)/f(n) = 1/a_m$. Therefore, $f(n) = \Omega(g(n))$. This proves Theorem 2.3. Theorem 2.5 follows from Theorems 2.1 and 2.3.