Bonus Challenge

Give an *original* proof for the following statement:

Theorem 1. *Let $g : [0,1]^n \to \mathbb{R}$ be a continuous function and σ be any continuous non-polynomial function. Define $f(x) = \sum_{i=1}^{m} a_i \sigma(w_i^T x)$. Prove that for any $\epsilon > 0$ there exist a set of parameters $\{w_i, a_i\}_{i=1}^{m}$ so that $\|f - g\| < \epsilon$.*