Consider the following objective function $L(w)$ for a given dataset $D = \{x_i, y_i\}_{i=1}^N$ with $x_i \in R^D$ and $y_i = \{0, 1\}$:

$$L(w) = \sum_{i=1}^{N} \left[f(w^T x_i) - y_i \right]^2$$

with logistic function

$$f(t) = \frac{1}{1 + \exp(-t)}$$

Show that $L(w^*)$ has a minimum value, not a maximum, at the w^* making $\frac{\partial L}{\partial w}\Big|_{w=w^*} = 0$.