Let $f : \mathbb{R}^2 \to \mathbb{R}$ be given by $f(x, y) = (x^2 - y^2)e^{-x^2-y^2}$.

a) Prove that f attains its minimum and its maximum.

b) Determine all points (x, y) such that $\frac{\partial f}{\partial x}(x, y) = \frac{\partial f}{\partial y}(x, y) = 0$ and determine for which of them f has global or local minimum or maximum.