## Exercises

E16.70 [1H8] Prerequisites: [1F6], [1H1]. Let $f, \varphi$ be class $C^1$ in the open set $A$, and let $\overline{x}$ be a local minimum point for $f$ bound to $E_a$ (so $\varphi(x) = a$). Show that $\lambda \in \mathbb{R}$ exists such that $\nabla f(\overline{x}) + \lambda \nabla \varphi(\overline{x}) = 0$; this $\lambda$ is called **the Lagrange multiplier**.

**Solution 1.** *[1H9]*