Due: June 24th

1. Let $f : \mathbb{R}^n \to \mathbb{R}$ be differentiable on $\mathbb{R}^n$ and $f(\mathbf{x}) = 0$ for all $\mathbf{x} \in \mathbb{R}^n$ with $\|\mathbf{x}\| = 1$. Show that there exists a point $\mathbf{c} \in B_1(\mathbf{0})$ such that $df_{\mathbf{c}}$ is the zero transformation. (This is a version of Rolle's Theorem in $\mathbb{R}^n$.)

   You may assume that $\overline{B_1(\mathbf{0})}$ is compact.