1. Let $f : M \to \mathbb{R}$ be smooth. Compute the coordinate representations for $df$.

(a) $M = \{ (x,y) \in \mathbb{R}^2 : x > 0 \}$ and let $f(x,y) = \frac{x}{x^2+y^2}$.

(b) $M = \mathbb{R}^n$ and $f(x) = \|x\|^2$ where the norm is the Euclidean norm.