Title

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Exercise 1.1.
Show that $\left\{(\mathbb{R}^1, \mathrm{id}), (\mathbb{R}^1, x \mapsto x^3)\right\}$ is *not* a smooth atlas.

Exercise 1.2.
Let $S^1 \coloneqq \left\{(x,y) \in \mathbb{R}^2 \;\middle|\; x^2 + y^2 = 1\right\}$ with charts given by stereographic projection from $(0,1)$ and $(0,-1)$ on $U = S^1 \setminus \{(0,1)\} \longrightarrow \mathbb{R}$ and $V = S^1 \setminus \{(0,-1)\} \longrightarrow \mathbb{R}$.

Show that this gives a smooth atlas.

Exercise 1.3.
Write down a smooth atlas on the unit square.