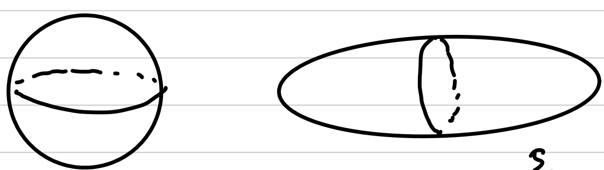
(Recall: defn $h: \overset{\text{uc}}{\mathbb{R}^2} \to \overset{\text{vc}}{\mathbb{R}^2}$ diffeomorphism)

<u>Defn</u> $f: S_1 \to S_2$ is a <u>diffeomorphism</u> if it is

- f is 1-1 and onto
- f is diffble
- f^{-1} is diffble. $\rightsquigarrow$ if such f exist, say S_1 and S_2 are <u>diffeomorphic</u>

Idea: Diffeomorphic surfaces are the same from the point of view of differential topology. S_1 can be smoothly deformed into S_2 w/o cuts or poking holes.

<u>Ex</u>: sphere/ellipsoid are diffeomorphic.



S_1 S_2

<u>Ex</u> f: cylinder $\to$ sphere above <u>not</u> a diffeomorphism.