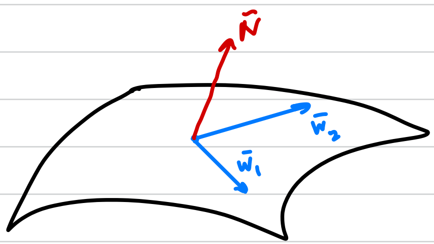
We will only consider orientable surfaces.

A choice of a smoothly varying normal vector field $\bar{N}$ on an orientable surface is called an orientation. A surface w/ an orientation is oriented.



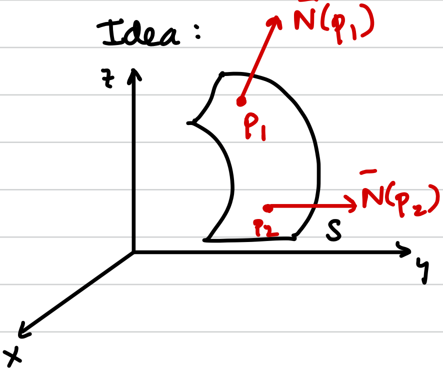
Once we know S is orientable and have chosen an orientation of S, we can define the Gauss map $\bar{N} : S \to S^2$ by

surface

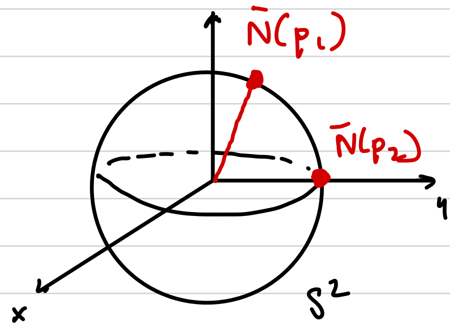
S^2 denotes unit sphere in $\mathbb{R}^3$.

$$\bar{N}(p) =$$

Idea:



$\bar{N}$



Can show $N : S \to S^2$ satisfies defn of differentiability

↳ let $\bar{x}$ be a chart on S. $N(\bar{x}(u,v)) = \dfrac{\bar{x}_u(u,v) \times \bar{x}_v(u,v)}{|\bar{x}_u(u,v) \times \bar{x}_v(u,v)|}$

↳ w.l.o.g. compose w/ $\bar{x}_\alpha^{-1}$.

We'll see: the Gauss map will allow us to study curvature.