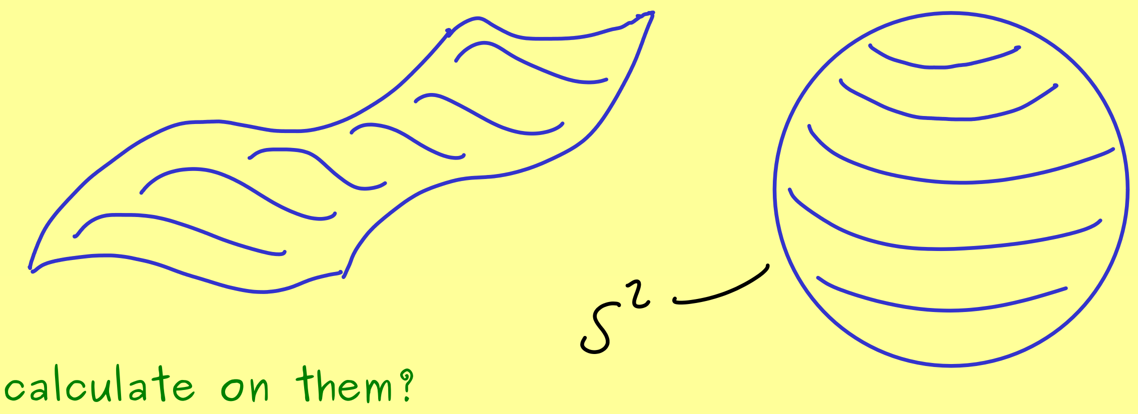
The Bright Side of Mathematics

Manifolds – Part 1

generalised surfaces?

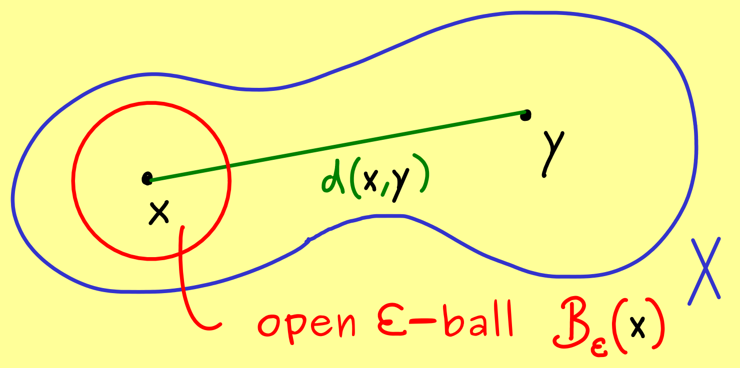


How to calculate on them?

topology | differentiable manifolds | differential forms $d\omega$ $\int d\omega$

$\Longrightarrow$ (generalised) Stokes's Theorem

Metric space: (X, d) — X: set, d: distance function



$\rightsquigarrow$ define open sets $A \subseteq X$

Definition: Let X be a set, $\mathcal{P}(X)$ be the power set, and $\mathcal{T} \subseteq \mathcal{P}(X)$ be a collection of subsets.

If $\mathcal{T}$ satisfies:
(1) $\emptyset, X \in \mathcal{T}$
(2) $A, B \in \mathcal{T} \Rightarrow A \cap B \in \mathcal{T}$
(3) $(A_i)_{i \in I}$ with $A_i \in \mathcal{T} \Rightarrow \bigcup_{i \in I} A_i \in \mathcal{T}$

then $\mathcal{T}$ is called a topology on X.

The elements of $\mathcal{T}$ are called open sets.

Examples:
(a) $\mathcal{T} = \{\emptyset, X\}$ is a topology on X (indiscrete topology)

(b) $\mathcal{T} = \mathcal{P}(X)$ is a topology on X (discrete topology)