

Geometry

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This article constitutes my notes for the ‘Non-Existent’ course, held in Lent 2022 at Cambridge. These notes are *not a transcription of the lectures*, and differ significantly in quite a few areas. Still, all lectured material should be covered.

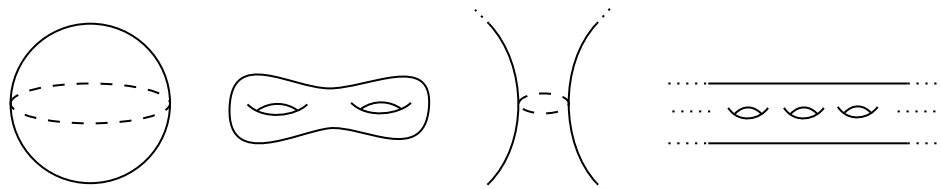
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§1 Topological and Smooth Surfaces

§1.1 Topological Surfaces

It is not too hard to think up many exotic ‘surfaces’ with different characteristics: holes, no holes, bounded, unbounded, and so on.



In this course we will frequently deal with such surfaces, and they are studied through the lense of topological surfaces.

Definition 1.1 (Topological Surface)

A topological surface is a topological space Σ such that

- (i) Each $p \in \Sigma$ has an open neighbourhood U with $p \in U$ such that U is homeomorphic to \mathbb{R}^2 , with its usual Euclidean topology.
- (ii) Σ is Hausdorff and second countable.