# Topology

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# 1 Manifolds

## 1.1 1 dimensional

- The Line $(E^1)$
- The Circle $(S^1)$
- The Interval $(I)$

## 1.2 2 dimensional

- Euclidean Plane $(E^2)$
- Sphere $(S^2)$
- Torus $(T^2)$
- Klein Bottle $(K^2)$
- Projective Plane $(P^2)$
- Disk $(D^2)$

## 1.3 3 dimensional

# 2 Terms

**Definition 2.1** (Topology vs. Geometry)**.**
The *topology* of a surface includes the properties of the surface that do not change when you stretch, twist, bend (without tearing) the surface. Such properties are:

- Number of holes the surface has

- ...

The *geometry* of a surface indludes all properties that do change when deforming the surface without tearing. Such properties are:

- ...

**Definition 2.2** (Instrinsic vs. Extrinsic)**.**
The *intrinsic* properties of a surface are those a flatlander would notice while the *extrinsic* properties are those a flatlander would not notice, but a being one dimension higher looking at the surface would. These properties can be topological or geometrical. Note: a manifold does not need to exist in a higher dimensional space. It can exits in and of itself.

/*intrinsic, extrinsic, geometry, topology table?*/

**Definition 2.3** (Local vs. Global)**.**

**Definition 2.4** (Homogenous vs. Nonhomogenous Geometries)**.**

**Definition 2.5** (Closed vs. Open Manifold)**.**

**Definition 2.6** (Orientable vs. Nonorientable)**.**