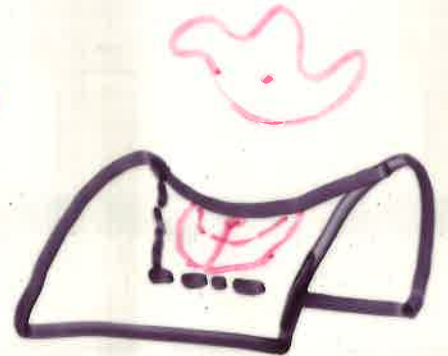


Gaussian Curvature - 2-dim

↑ Intrinsic

Is the manifold curved or flat



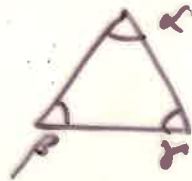
elliptic
Riemann
squares

flat
Euclidean
(parabolic)

hyperbolic
Gauss, Bolyai,
Lobachevsky



1) squares



2) triangles

$$\pi < \Sigma < 5\pi$$

(180°) (900°)

$$\Sigma = \alpha + \beta + \gamma = \pi$$

$$0 < \Sigma < \pi$$

3) Circles



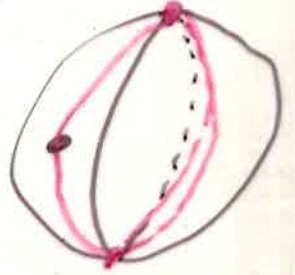
$$P = \frac{C}{D} < \pi$$

$$P = \frac{C}{D} = \pi$$

$$P = \frac{C}{D} > \pi$$

4) Euclid's 5th postulate (Parallel Postulate)

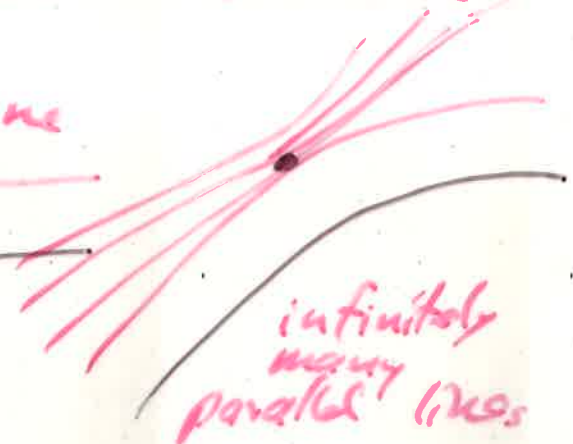
no parallel lines



one parallel line



infinitely many parallel lines



Parallel Transport

Gaussian Curvature

$$K = \frac{1}{R^2} \text{ for a sphere}$$