

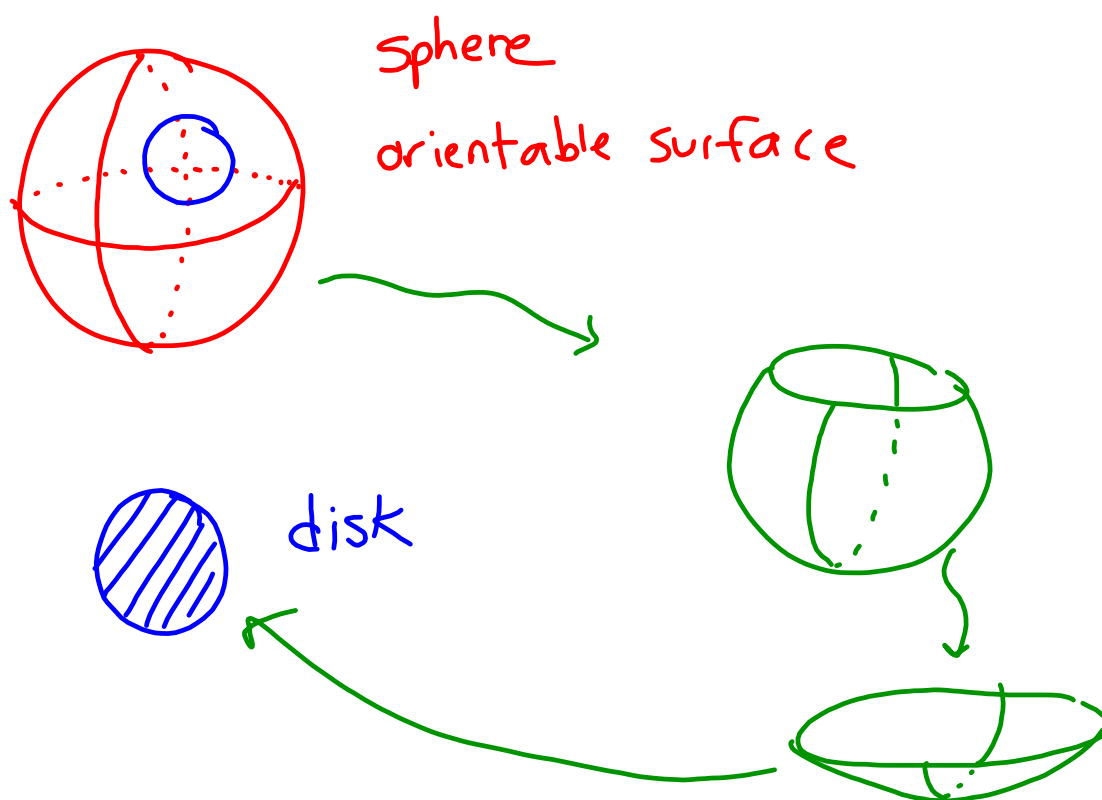
interesting suggested
homework assignment :

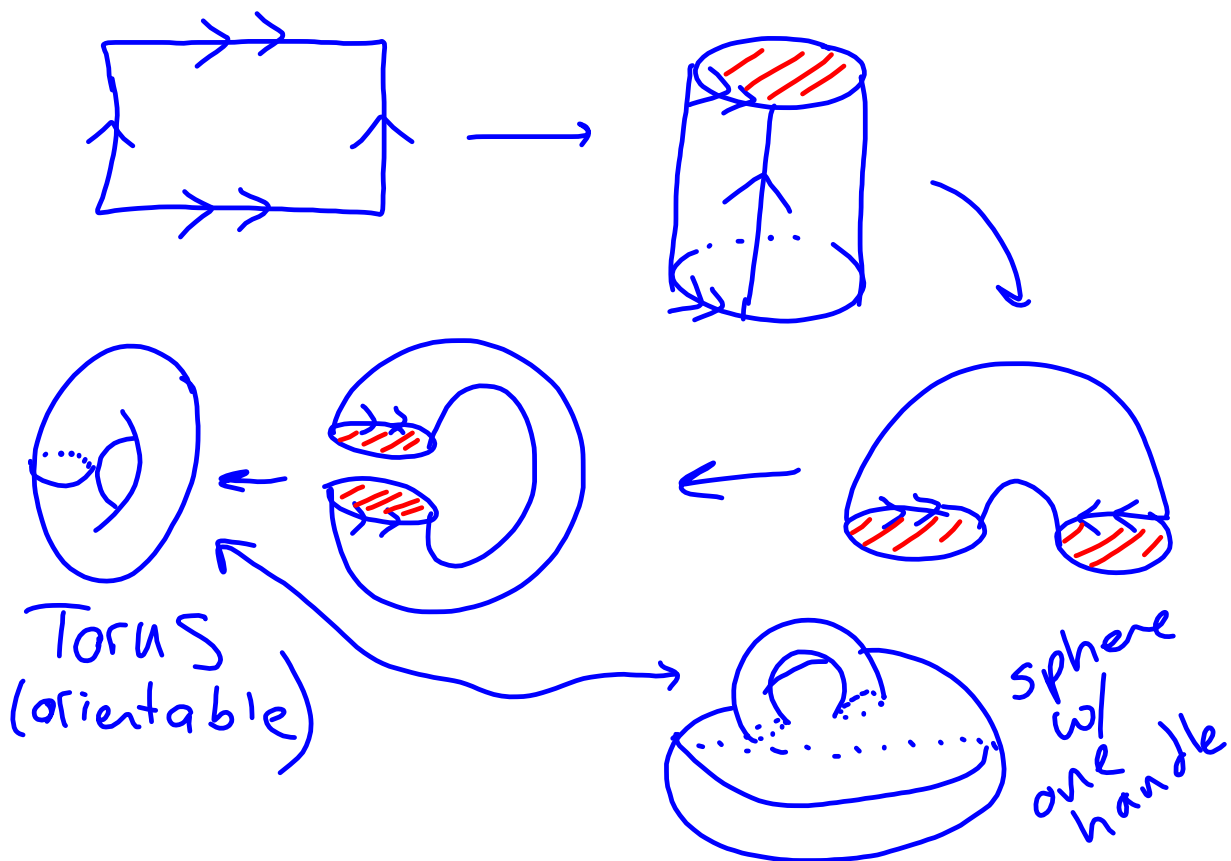
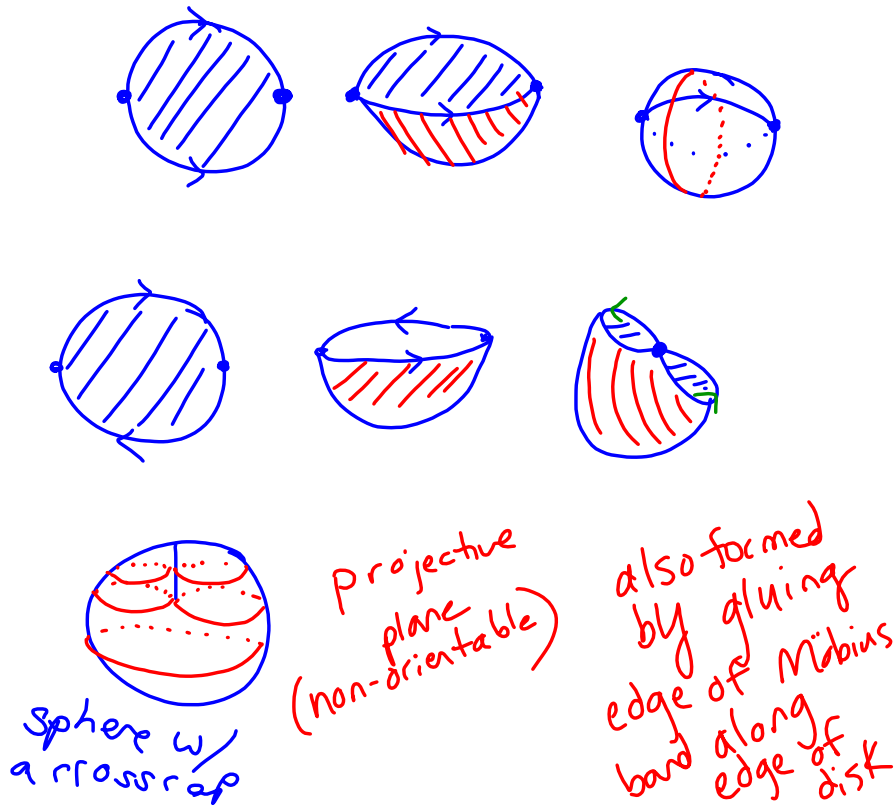
make 2 new Möbius bands,

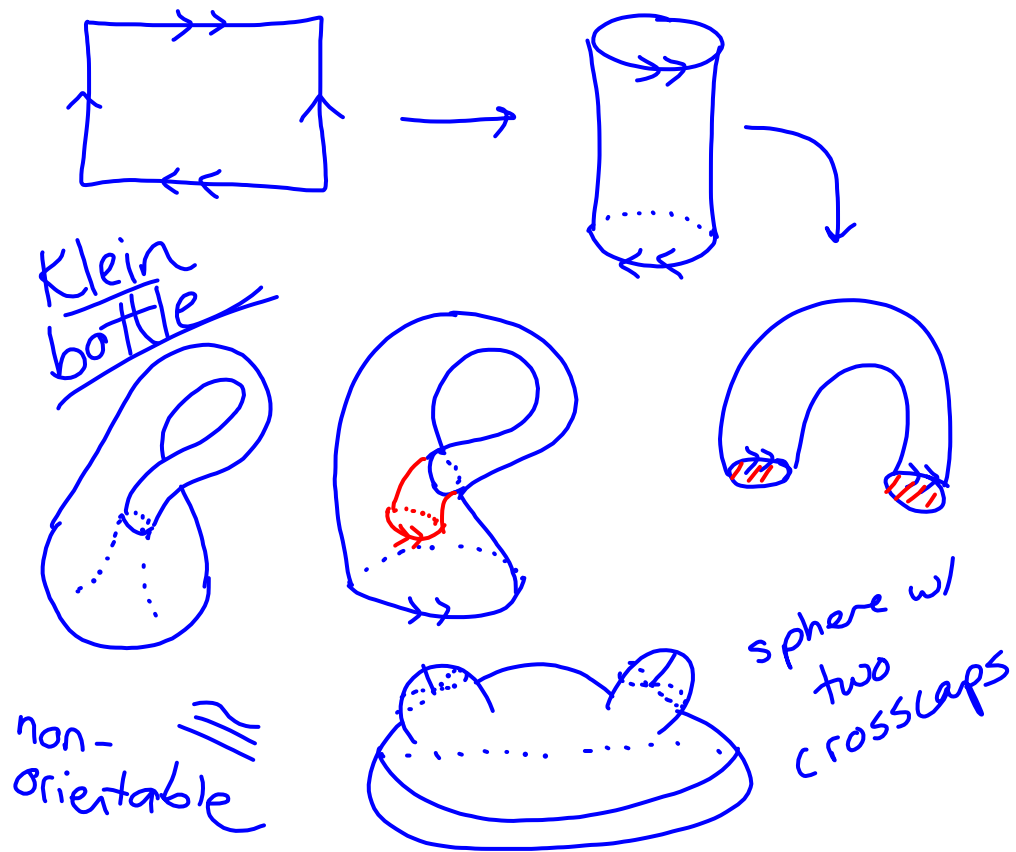
- cut one along center line

- cut the other along a line
closer to edge ($\frac{1}{3}$ or $\frac{1}{4}$)

& see what happens!

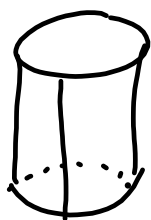
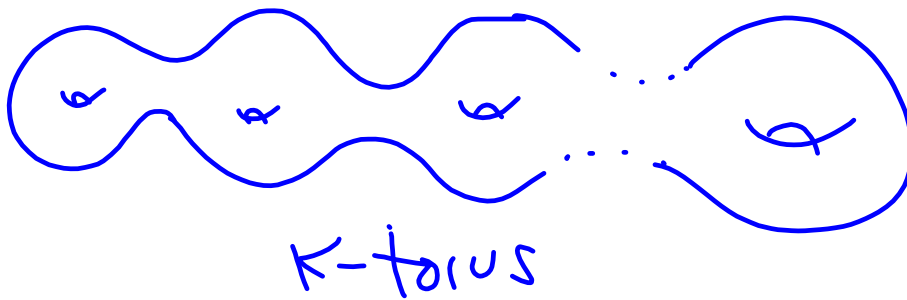
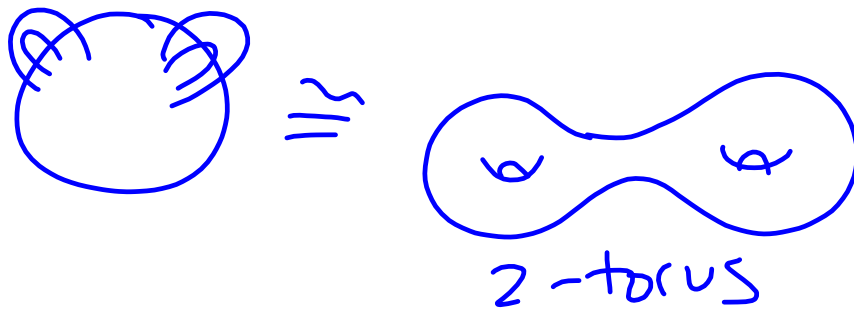




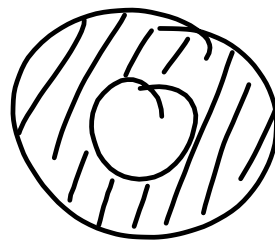


what happens if we have a handle & a crosscap?



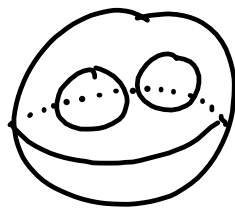


cylinder



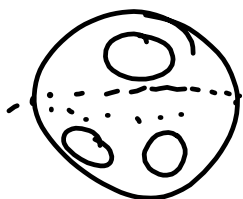
disk w/
a hole

sphere
w/
2 holes

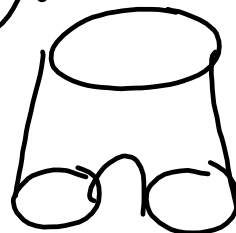


annulus

sphere w/ 3 holes

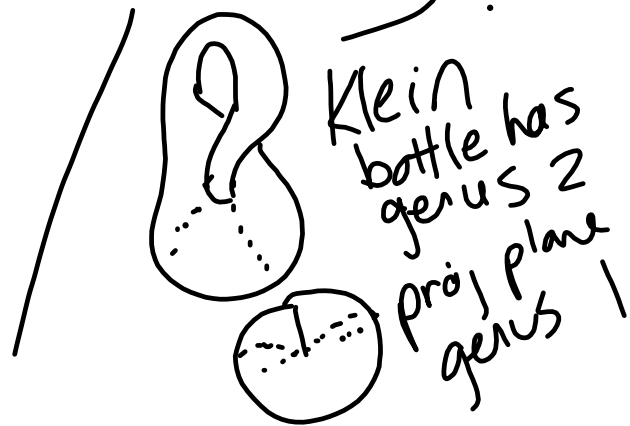
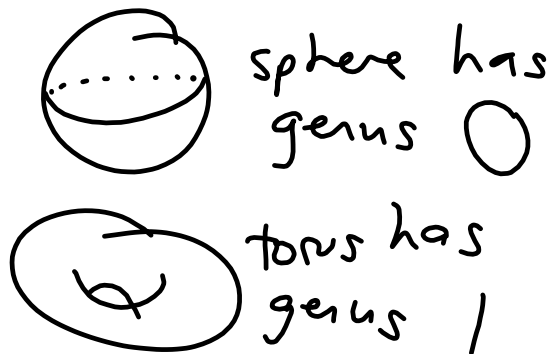


disk w/ 2 holes



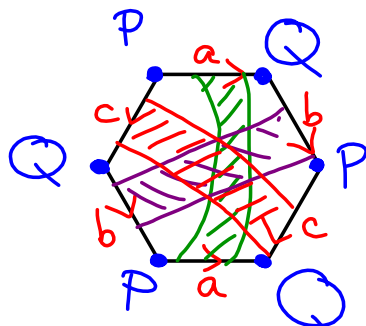
pair of
pants!

The genus of a surface
 is the number of handles (orientable)
 or cross-caps (non-orientable).



$$abca^{-1}b^{-1}c^{-1}$$

orientable
 (no Möbius bands)



Euler characteristic

$$\chi(S) = v - e + f$$

$$V = 2 = 2 - 3 + 1$$

$$E = 3 = 0$$

$$F = 1$$

genus:

orientable

non-orientable

$$\chi(S) = 2 - 2g - b$$

$$\chi(S) = 2 - g - b$$

no boundary components

$$0 = 2 - 2g - 0$$

$$2g = 2$$

$$g = 1$$

genus 1 \Rightarrow
 sphere w/ 1 handle
 (torus)