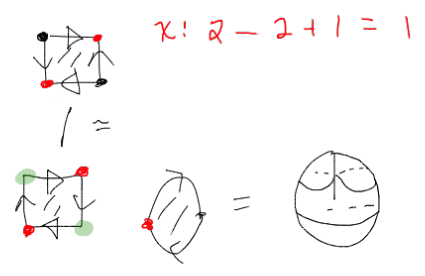


Connected Sum:

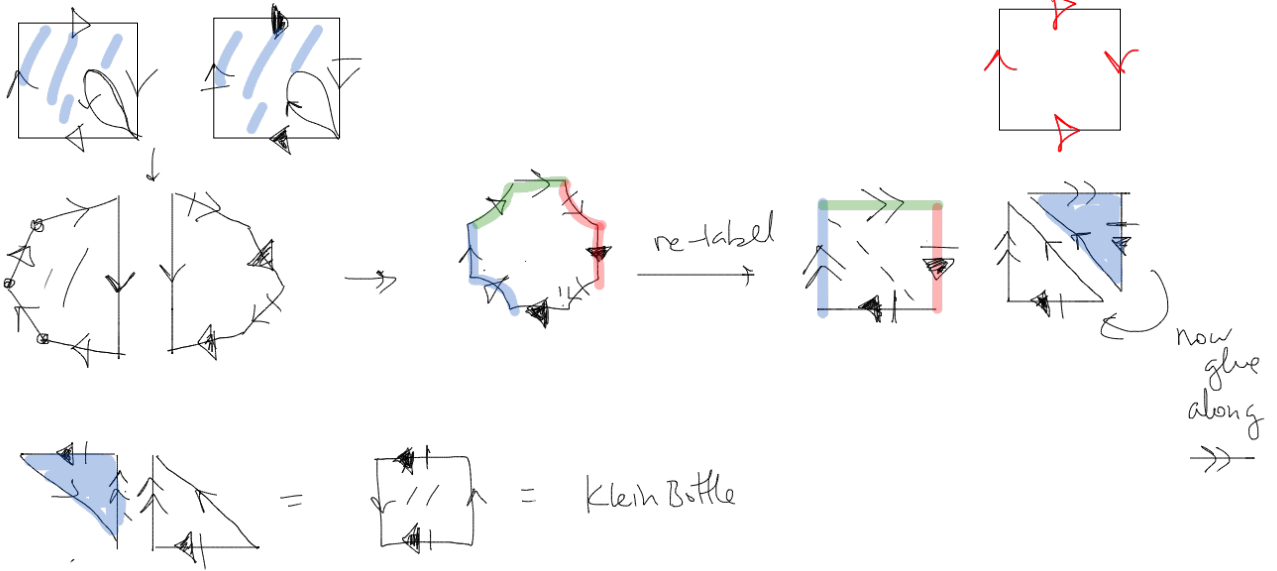
Let K = Klein bottle \longrightarrow 

Let P^2 = projective plane \longrightarrow 



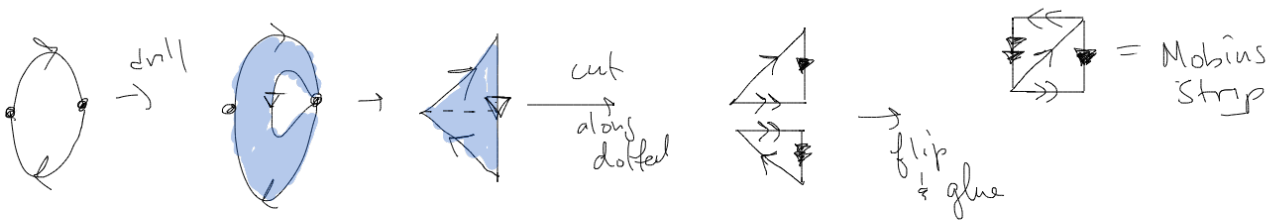
Ex. $\chi(P^2) = 2 - 2 + 1 = 1$

Ex. $P^2 \# P^2 \longrightarrow K$

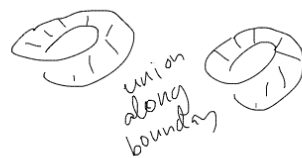


Note: If we glue two punctured projective planes together along their boundary we get a Klein Bottle.

And: If we remove a disk from a proj plane (we puncture it)



$P^2 \# P^2 = \text{Klein Bottle} = \text{Two Möbius bands glued along boundary circle}$



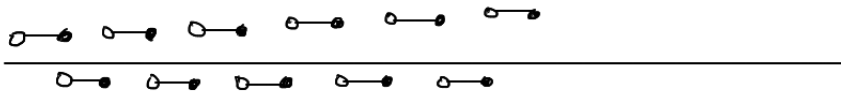
3.24

$$X = (\mathbb{R}, \text{std})$$

$f(x) =$ the interval $(n, n+1]$ that contains x .

$$X^* = (\dots, (-1, 0], (0, 1], (1, 2], (2, 3], (3, 4], \dots)$$

general $\rightarrow (n, n+1]$



what are open sets in the quotient topology _____

Is $(-1, 0]$ open in the quotient top?

$$f^{-1}(-1, 0] = (-1, 0] \text{ not open.}$$

Is $A = (-1, 0] \cup (0, 1] \cup (1, 2] \cup (2, 3] \cup \dots$

open?

yes b/c $f^{-1}(A) = (-1, \infty)$