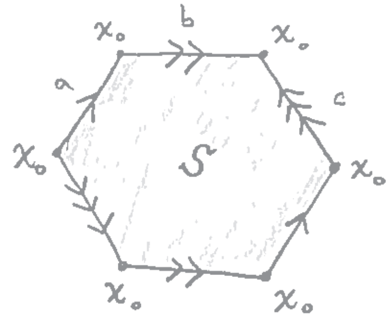
Name :

Consider the "mystery surface":



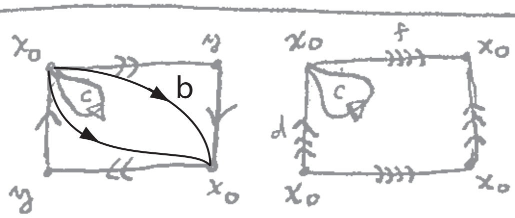
1) Find $\chi(S)$.

$1 - 3 + 1 = -1$

2) Find a presentation for $\pi_1(S)$.

$\langle a, b, c \mid abc^{-1} = cba \rangle$

3) $P^2 \# T^2$ =



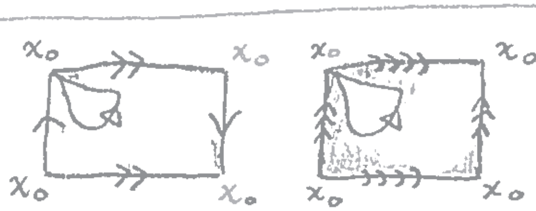
a) Find $\chi(P^2 \# T^2)$.

$2 - 5 + 2 = -1$

b) Find a presentation for $\pi_1(P^2 \# T^2)$

$\langle b, c, d, f \mid cb = b^{-1}, \; dcf = fd \rangle$

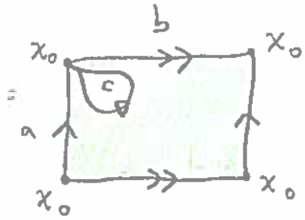
4) $K^2 \# T^2$ =



Find $\chi(K^2 \# T^2)$.

$1 - 5 + 2 = -2$

5) $T^2 - D^2$ =



a) Find $\chi(T^2 - D^2)$

$\boxed{1 - 3 + 1 = -1}$

b) Find a presentation of $\pi_1(T^2 - D^2)$

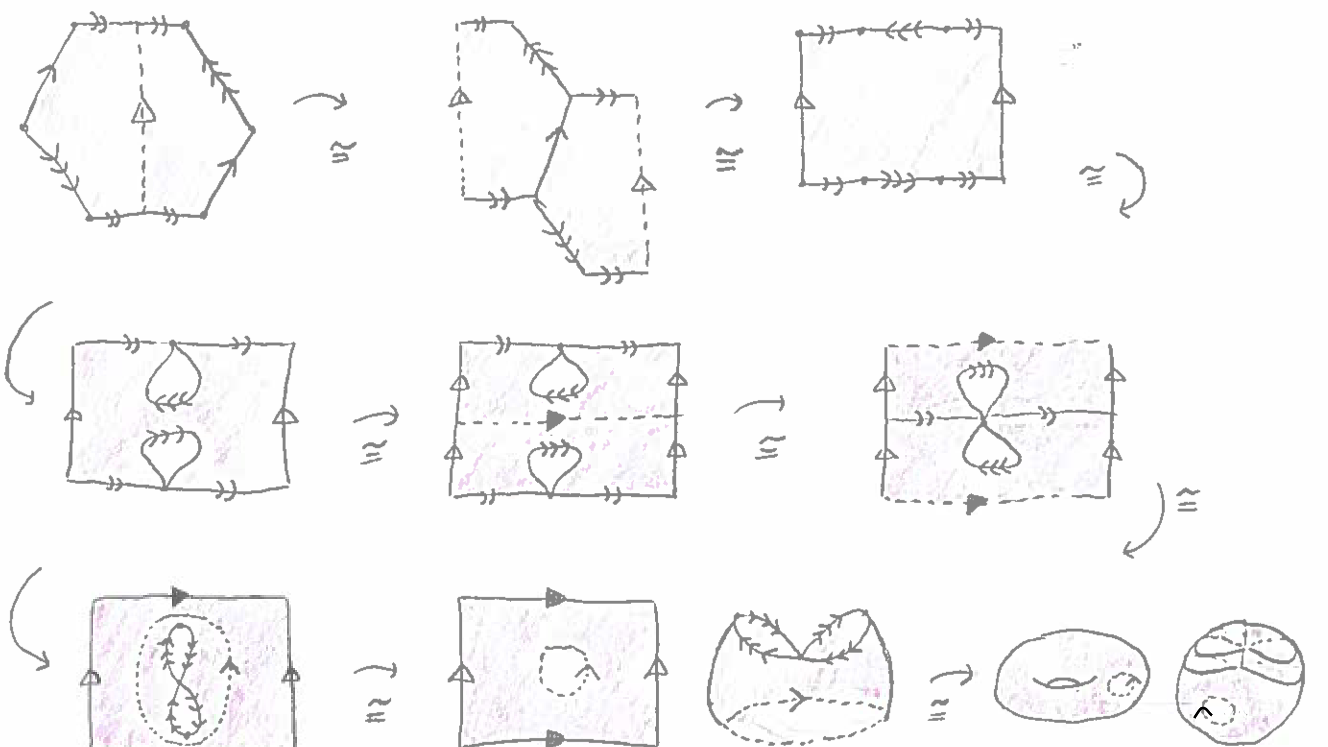
$\boxed{\langle a, b, c \mid acb = ba \rangle}$

6) Recall: χ and π_1 are homotopy invariants, and thus also homeomorphism invariants.

That means, from (4), $S \not\cong K^2 \# T^2$, and $S \not\equiv K^2 \# T^2$.

However, χ and π_1 don't tell us which spaces <u>are</u> homeomorphic. A cut-and-glue sequence allows us to construct a homeomorphism.

$S =$



$= \boxed{T^2 \# P^2}$.