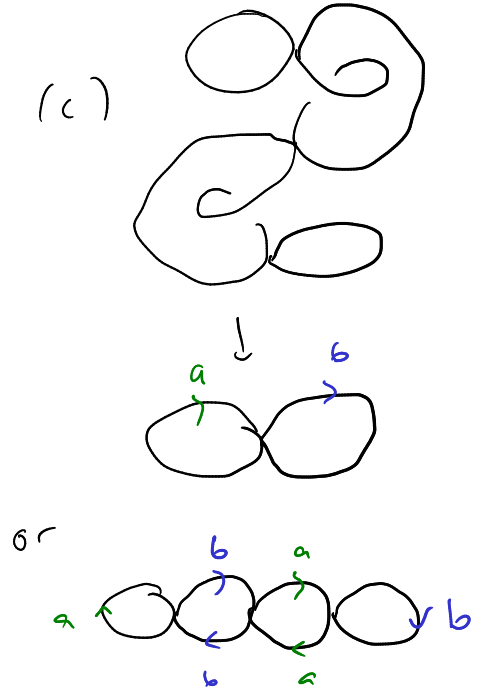
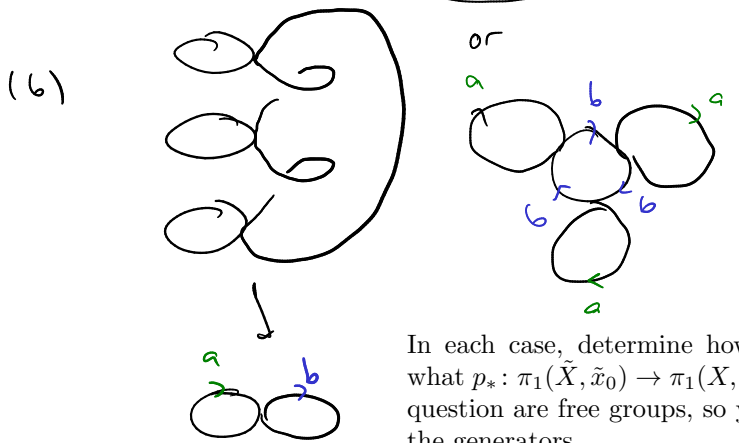
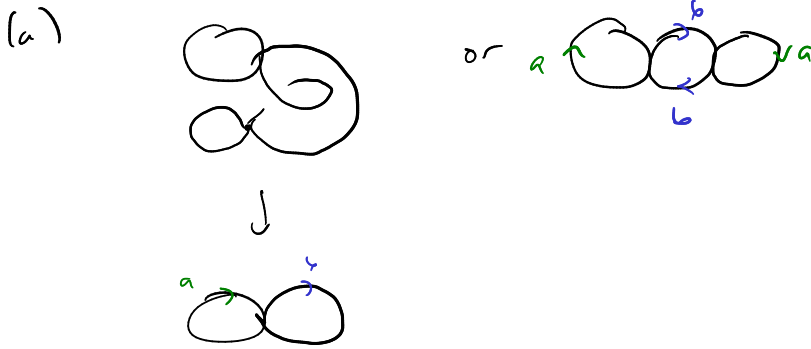


Worksheet 13

Math 634, Algebraic Topology

Monday, November 2, 2020

1. Let $X = S^1 \vee S^1$, and let $x_0 \in X$ be the wedge point. In lecture we looked at three different covers $p: (\tilde{X}, \tilde{x}_0) \rightarrow (X, x_0)$:



In each case, determine how $\pi_1(X, x_0)$ acts on the fiber $p^{-1}(x_0)$, and what $p_*: \pi_1(\tilde{X}, \tilde{x}_0) \rightarrow \pi_1(X, x_0)$ looks like. All the fundamental groups in question are free groups, so you can just think about what happens with the generators.

2. Same with the two-sheeted cover from the torus to the Klein bottle:

