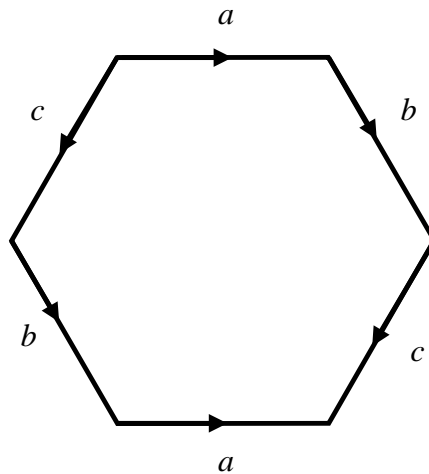


## Math 490 Homework #4

due Wednesday, 10/3

- 1: Kinsey, 4.4 (p. 60).
- 2: Kinsey, 4.10 (p. 75).
- 3: Which surface is this?



- 4: We discussed in class the fact that  $P^2 \# P^2 \simeq K^2$ , equivalently, two copies of the Möbius strip glued along their edges, forms a surface homeomorphic to  $K^2$ . Draw a closed path on the following picture of the Klein bottle  $K^2$  which separates  $K^2$  into two Möbius strips.

- 5: (a) Draw all possible planar diagrams consisting of a triangle with a pair of sides identified. Each one is homeomorphic to a surface with a single boundary component. Identify that surface for each of your diagrams.  
 (b) Draw all possible planar diagrams consisting of a square with a single pair of sides identified. Each one is homeomorphic to a surface with either one or two boundary components. Identify that surface for each of your diagrams.  
 (Hint: There are two diagrams in part (a) and four diagrams in part (b).)