

## Problem Set #4

Due: Wednesday, Feb. 8

1. Prove that if  $f_1, f_2 \in \Omega(X, p)$ ,  $\phi \in C^0(X, Y)$  and  $f_1 \sim f_2$  then  $\phi \circ f_1 \sim \phi \circ f_2$ .
2. Let  $X = [0, 1] \times [0, 1]$  denote the rectangle in  $R^2$ . Let  $\sim$  be the equivalent relation generated by  $(0, p) \sim (1, 1 - p)$  where  $0 \leq p \leq 1$ . The quotient space  $X/\sim$  is called the Möbius band. Show that  $S^1$  is a retract of the Möbius band.
3. Do problem 7-2 on page 176 of the textbook.