

# HW

1. Prove that the topologist's sine curve is connected but not path connected.
2. Rigorously state and prove a statement to the effect of "path components are the largest path connected subsets"
3. Is a product of path connected spaces path connected ? If  $A$  is path connected, then is  $\bar{A}$  path connected ?
4. Give a counterexample to show that path components need not be open. Likewise, give a counterexample to show that path components need not be closed.