

Topology, Discussion Topics, 8/25/08

1. Try to gain an intuitive sense of when things are topologically the same by considering the following.
 - (a) Convince yourself and those in your group that the object in figure 1 can be continuously deformed into the object in figure 2. Does this mean that they are topologically the same.
 - (b) Do you think the object in figure 3 (Trefoil) can be continuously deformed to the standard torus? What about if you allow for higher dimensions? Why or why not?
 - (c) Consider the object in figure 4 (the Klein Bottle). Do you think that this can be deformed into the standard torus? Why or why not?
 - (d) Based on the above insights, how would you formulate what it means for two objects to be topologically the same? How general is your formulation? What does it depend upon?
2. Which of the following are topological spaces? For those that are, verify in detail that they satisfies the conditions of a topological space.
 - (a) The set $X = \{a, b, c\}$ with the open subsets $\{\emptyset, X, \{a, b\}\}$
 - (b) The set $X = \{a, b, c\}$ with the open subsets $\{\emptyset, X, \{a, b\}, \{b, a\}, \{b\}\}$
 - (c) The set $X = \{a, b, c\}$ with the open subsets $\{\emptyset, X, \{a, b\}, \{b, a\}, \{b\}, \{c\}\}$
 - (d) The real line, with the open subsets consisting of the empty set, the whole real line, and the collection of all sets whose complement is finite.
 - (e) An arbitray set X with the open subsets $\{\emptyset, X\}$

Class Preparation for 8/28/08

Please complete this before class on 8/28/08 and bring it to class to hand in.

Doing this assignment is part of your class participation/preparation grade, but what you say on it will not effect your grade in the slightest. It will help me gauge how much review is needed and on which topics.

Please read all of chapter 0. Make a column list of all definitions and theorems that occur in sections 0.3,0.4,0.5,0.6. (Don't write out the definition, just list the word being defined, and don't write out the theorem, just list the theorem number.) In the second column, beside each item write how confident you are with that item on a scale of 1-10 with 1 lowest and 10 highest. In a third column, write where you first learned about that topic (e.g. High School (HS), Foundations of Analysis (FA), This Book (TB)), you can use abbreviations but provide a key.