Introduction to knot theory, Spring 2012

Homework 5, due Monday, February 27

Read sections 5 and 6 of Knotes.

Exercises 5.2.7, 5.2.12, 5.7.10, 5.7.14, 5.7.15, 6.1.11, 6.2.9.

1. Which of the following spaces are contractible?
(a) $\mathbb{C}$,
(b) $\mathbb{C} \setminus \{0\}$,
(c) $\{z \in \mathbb{C} | \mathrm{Re}(z) \geq 0, \mathrm{Im}(z) < 0\}$,
(d) The set of irrational real numbers (with topology induced from that of $\mathbb{R}$).

Extra credit:
I. Try to define the notion of knot genus where you allow the surface whose boundary is the knot to be unorientable. Your genus must be 0 on the unknot and 1 on the trefoil (trefoil bounds a Möbius band). Is your genus additive under connected sum?

II. Can you define a topology on a given set X to make it a contractible topological space?