Topology

Homework #5. Due Monday, October 16, before the lecture.

Read §20, §21, the first half of §25, and do the following problems.

Exercises 2 and 4 on page 127.

Exercise 1 on page 133.

1. Write down all letters of the alphabet, in capitals. Group the letters into subsets of homeomorphic letters (the letters which represent homeomorphic topological spaces). Justify your answer.

2. Give an example of two connected sets whose intersection is not connected.

3. We proved that the image of a connected set under a continuous map is connected. Show by example that the inverse image of a connected set is not necessarily connected.

4. (a) Describe connected components of the set $\mathbb{R} \setminus \mathbb{N}$.

(b) Show that the set $\mathbb{R}^2 \setminus \mathbb{Q}^2$ is connected.