

You are expected to do the following problems to a high standard (i.e., at least well enough to be published in a textbook) for full credit. Four of these problems will be selected (by Jon) for grading, with each worth 5 points.

1. Let X be a topological space. If X is a T_1 -space, then X is a T_0 -space.
2. Let X be a topological space. If X is a T_2 -space, then X is a T_1 -space.
3. Let X and Y be nonempty topological spaces. The product space $X \times Y$ is a T_0 -space iff both X and Y are T_0 -spaces.
4. Let X and Y be nonempty topological spaces. The product space $X \times Y$ is a T_1 -space iff both X and Y are T_1 -spaces.