

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. [Baker Review 8.2] If (X, \mathcal{T}) is any topological space, then there is a metric d such that the metric topology induced by d is the same as \mathcal{T} .
2. [Baker Review 8.5] If there are two different metrics for a given set, then the corresponding metric topologies are different.
3. [Baker Review 8.7] If (X, d) is any nonempty metric space, then for any positive integer N there exist distinct points x and y in X such that $d(x, y) < 1/N$.
4. [Baker Review 8.10] If X is a discrete topological space, then X is metrizable.
5. [Baker Review 8.12] Every compact metric space is complete.
6. Baker Review 8.13] Every complete metric space is compact.