

Homework 1
Real Analysis
Math 212a – Harvard University
Due Thursday, 25 September 2003

Do the following problems from Royden:

Chapter 1: 20.

Chapter 2: 38, 39, 43, 48, 50(a,b,c,h), 54.

In addition:

1. Let $(X, <)$ be a partially ordered set. Show that $<$ can be extended to a total ordering of X : i.e. there is a total ordering (X, \ll) such that $x \ll y$ if $x < y$.
2. Construct a homeomorphism from $[0, 1] \cap \mathbb{Q}$ to $(0, 1) \cap \mathbb{Q}$.
3. Let us say $f : [0, 1] \rightarrow \mathbb{R}$ is *pretty continuous* if the set of points where f is continuous is dense. Show that the sum of two pretty continuous functions is also pretty continuous.