Math 445 – David Dumas – Spring 2018

Homework 3

Due Monday, February 12 in class (1:00pm)

Follow the same instructions given on Homework 1.

(—) From the textbook: 17.10, 17.13, 18.2, 18.3, 18.7a

(P1) Consider the sequence $x_n = n$ in $\mathbb{R}$. (That is, this sequence begins with $1, 2, 3, \ldots$) For each topology on $\mathbb{R}$ listed below, determine all of the real numbers x so that the statement "x_n converges to x" is true for that topology.

(a) The trivial topology
(b) The cofinite topology
(c) The standard topology
(d) The lower limit topology
(e) The discrete topology

(P2) Consider the bijective function $f : \mathbb{R}_\ell \to \mathbb{R}_\ell$ defined by $f(x) = -2x$. Is this function continuous? Is it a homeomorphism? (Recall that $\mathbb{R}_\ell$ refers to the lower limit topology on the set $\mathbb{R}$ of real numbers.)