Math 330 Section 2 - Spring 2017 - Homework 19

Published: Thursday, May 1, 2017 *Running total:* 62 *points*
Last submission: Tuesday, May 10, 2017

Status - Reading Assignments:

Here is the status of the reading assignments you were asked to complete by this date.

B/G (Beck/Geoghegan) Textbook:
- all of ch.1 - ch.13 (ch.7 carefully until before thm.7.17, ch.11 until cor.11.23)
- B/G Appendix A: Continuity and Uniform Continuity

MF lecture notes:
- ch.1 - ch.2, ch.4 - ch.12.3 (skip the proof of prop.7.3 and of thm.10.17 (Riemann's Rearrangement Theorem; skip lemmata 12.4 and 12.5. alltogether).
- ch.16 (addenda to B/G text)

Other material:
- B/K lecture notes ch.1 – section 1, ch.4.1, ch.4.2
(optional reading – good for examples, improved understanding)
- Stewart Calculus: "The Precise Definition of a Limit" (ch.1.7 in the 7th edition).

New reading assignments: NONE!

Written assignment 1: TWO points

Let $N \in \mathbb{N}$. Let $X := \{x_1, x_2, \dots, x_N\}$ be a finite set with a metric $d(\cdot, \cdot)$ (so (X, d) is a metric space). Prove that X is compact two different ways:

a. Show sequence compactness to prove that X is compact.
b. Show that X has the "extract finite open subcovering" property to prove that it is compact.

Hints:
a. ANY sequence in X possesses a constant subsequence (WHY?)
b. If $(U_i)_i$ covers X then for each x there exists (at least one) i such that $x \in U_i$ (WHY?) How many of those U_i do you need to cover X if X has only N elements?