Math 330 Section 1 - Fall 2016 - Homework 16

Published: Monday, December 28, 2016 *Running total:* 61 *points*
Last submission: Friday, December 9, 2016

Status - Reading Assignments:

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

B/G (Beck/Geoghegan) Textbook:
ch.1 - ch.13 (skim 7.2)
Appendix A: Continuity & Uniform Continuity

MF lecture notes:
ch.1, ch.2, ch.4-10, ch.11 up to and including ch.11.4, prop 11.4

B/K lecture notes (optional reading – good for examples, improved understanding):
ch.1.1, ch.4.1, ch.4.2

New reading assignments:

Use the latest version 2016-11-29 of the MF doc to read ch.11!

Reading assignment 1 - due Wednesday, November 30:
Reread carefully MF ch.11 up to and including ch.11.4, prop 11.4
Read carefully the remainder of MF ch.11.4
Read carefully def.11.4, def 11.5 ([covering] compactness) of MF ch.11.6(!)

Reading assignment 2 - due: Friday, December 2:
Read carefully all unread parts of MF ch.11 until before appendix 11.6.1

Written assignment 1:

MF Proposition 10.12 (ch.10.2.2 Continuity of constants and sums and products) does NOT have a proof of the following: Let (X, d) be a metric space and $f, g : X \to \mathbb{R}$ both be continuous at $x_0 \in X$. Prove that if $g(x_0) \neq 0$ then f/g is continuous at x_0 in two stages.

a. prove that $h(x) := 1/g(x)$ is continuous at x_0.
Hint: Use sequence continuity and results in B/G ch.10.4 concerning sequences of real numbers. Do not attempt to use the $\varepsilon - \delta$ characterization of continuity.
b. Now rewrite f/g as a _________ and use a result in MF ch.10.2.2 to conclude that f/g is continuous at x_0

Written assignment 2:

Give an alternate proof of Theorem 11.7 of ch.11.5 (Continuous images of compact spaces are compact), using sequence compactness. You can find an outline of the proof in remark 11.3 but you must flesh it out.