Math 330 Section 1 - Fall 2016 - Homework 13

Published: Friday, November 4, 2016 *Running total:* 54 *points*
Last submission: Friday, November 18, 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.10 (skim 7.2)

MF lecture notes:
ch.1, ch.2, ch.4-ch.6, ch.8-ch.9 (ch.9.2 carefully)
ch.10.1, ch.10.2.1–10.2.5

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

New reading assignments:

Reading assignment 1 - due Monday, November 7:
Read a second time MF ch.10.1.4. – end of ch.10.1

Reading assignment 2 - due: Tuesday, November 1:
Read a second time MF ch.10.2.1. – 10.2.5

Reading assignment 3 - due Wednesday, November 2:
Read carefully MF ch.10.2.6.–10.3.1

Reading assignment 4 - due Friday, November 4:
Read carefully the remainder of MF ch.10.

Written assignment 1:

Prove exercise 10.1: Given is a metric space (X, d). Prove the following: A sequence (x_n) of elements of X converges to $a \in X$ as $n \to \infty \Leftrightarrow$ for any neighborhood U of a there exists some $n_0 \in \mathbb{N}$ such that the n_0–tail set $T_{n_0} = \{x_j : j \geqq n_0\}$ is contained in U.

1a: Prove "$\Rightarrow$" **1b:** Prove "$\Leftarrow$" (one point each).

Written assignment 2:

Let $(X, \mathfrak{U})$ be an abstract topological space and let $A \subseteq X$. We call $x \in X$ a **boundary point** of A if the following is true for **any** neighborhood U_x of x: Both $U_x \cap A \neq \emptyset$ and $U_x \cap A^{\complement} \neq \emptyset$ (draw a picture!)
Prove that such a boundary point is not an interior point of A.