Math 330 Section 3 - Fall 2017 - Homework 16

Published: Thursday, November 16, 2017 *Running total:* 58 *points*
Last submission: Friday, December 1, 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.6, ch.7 (skip after thm.7.17), ch.8 – 13.
B/G Appendix A (Continuity and Uniform Continuity)

MF lecture notes:
ch.1; ch.2 except optional ch.2.2.1 (Rings & Algebras of Sets),
ch.4 – 7,
ch.8, except: Skip the proofs of prop.8.13, 8.14, 8.15, cor.8.2, thm.8.2;
ch.9 except optional ch.9.2.3, ch.10 except optional ch.10.1.6, ch.11.1 and 11.2,
ch.13.1 up to and including example 13.5,
ch.16 (Addenda to B/G): the chapters corresponding to what has been assigned from B/G.

B/K lecture notes:
ch.1.1 (Introduction to sets) (optional)
ch.1.2 (Introduction to Functions) but skip ch.1.2.4: Floor and Ceiling Functions (optional)

Other:

- Stewart Calculus 7ed - ch.1.7: "The Precise Definition of a Limit". If you have a newer or older edition then you may have to search through the table of contents and/or consult the index.
- Paul Dawkins: Linear Algebra (lecture notes): Vector Spaces – Subspaces p.193: def.1, thm 1 – Span, p.202: def 1, def 2, thm 1 – Linear independence, p.210: def.1 – Basis & dimension, p.220: def.1, thm 2, def 2, thm 3.

New reading assignments:

Reading assignment 1 - due Monday, November 20:

a. Read carefully MF ch.11.3 and 11.4. This is very tough reading and you need to understand the material in MF ch.10.1 and ch.10.2.

Reading assignment 2 - due: Wednesday, November 22:

a. Read carefully the remainder of MF ch.11 **This assignment will be repeated for Monday, November 27.**

Written assignment 1: MF Exercise 10.2. Prove thm.10.1.

Let $(V, \|\cdot\|)$ be a normed vectors space. Then the function

$$d_{\|\cdot\|}(\cdot,\cdot) : V \times V \to \mathbb{R}_{\geqq 0}; \qquad (x, y) \mapsto d_{\|\cdot\|}(x, y) := \|y - x\| \tag{0.1}$$

defines a metric space $(V, d_{\|\cdot\|})$.

Hint: This proof is very easy. Even the triangle inequality for the metric $d(x, y) = \|x - y\|$ follows easily from the triangle inequality for the norm.

Written assignment 2: MF Exercise 10.16. Prove prop.10.15.

Let $(X, \mathfrak{U})$ be a topological space and $A \subseteq B \subseteq X$. Then $\bar{A} \subseteq \bar{B}$.

Written assignment 3: MF Exercise 10.15. Prove prop.10.17.

Let $(X, \mathfrak{U})$ be a topological space and $A \subseteq X$. Then $\partial A = \bar{A} \cap \overline{A^{\complement}}$.