Math 330 Section 3 - Fall 2017 - Homework 15

Published: Thursday, November 9, 2017   *Running total:* 55 *points*
Last submission: Monday, November 27, 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.

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.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 Wednesday, November 15:

  a. Review MF ch. 7 – 10.1.3.
  b. Review B/G ch. 8 – 13.
  c. As you review the material, jot down **1)** just enough about the definitions and major propositions and theorems that you know what they refer to; **2)** references to those props, thms and examples that have solutions and look easy. Prepare for the exam (and the final) by picking some of that stuff and writing down from memory the definitions you picked and trying to do some of the easy proofs. If you get stuck, look up just enough of the solution so that you know how to continue.

Reading assignment 2 - due: Friday, November 17:

  a. Read carefully B/G Appendix A (Continuity and Uniform Continuity). You have encountered all of this already in MF ch.10.
  b. Read carefully MF ch.11.1 and 11.2.

Written assignment 1: (worth 2 points, one each for **a**, **b**).
Do MF exercise 10.5: Let $a, b \in \mathbb{R}$ such that $a < b$. Prove the following.

    a.   The closed interval $[\,a, b\,]$ is not open in $(\mathbb{R}, d_{|\cdot|})$.
    b.   The complement of the closed interval $[\,a, b\,]$ is open in $(\mathbb{R}, d_{|\cdot|})$.

You are not allowed to use material beyond ch.10.1.3 (Neighborhoods and Open Sets) to prove any of this.

Hint for b: What is $[\,a, b\,]^{\complement}$? Work with $\varepsilon = a - x$ or $\varepsilon = x - b$ to find neighborhoods of x which are entirely contained inside $[\,a, b\,]^{\complement}$.