Math 330 Section 3 - Fall 2017 - Homework 12

Published: Thursday, October 19, 2017 *Running total:* 47 *points*
Last submission: Friday, November 3, 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 – 11, ch.12 through prop.12.7.

MF lecture notes:
ch.1; ch.2 except optional ch.2.2.1 (Rings & Algebras of Sets),
ch.4 – 6, ch.7.1 until before prop.7.1,
ch.8, except: Skip the proofs of prop.8.13, 8.14, 8.15, cor.8.2, thm.8.2; skip rem.8.6
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.

New reading assignments:

Reading assignment 1 - due Monday, October 23:

- **a.** Read carefully the end of B/G ch.12.
- **b.** Continue carefully reading MF ch.7 through cor.7.5 ($\mathbb{Z}$ is countable).

Reading assignment 2 - due: Wednesday, October 18:

- **a.** Continue carefully reading the remainder of MF ch.7.

Reading assignment 3 - due Friday, October 20:

- **a.** Carefully reread MF ch.8.5 (Sequences that Enumerate Parts of Q). Skip nothing!
- **b.** Read carefully B/G ch.13.1. Lots of overlap with MF ch.7!

Written assignment 1:
Prove B/G Thm.11.12, p.110: If $r \in \mathbb{N}$ is not a perfect square, then $\sqrt{r}$ is irrational.
Hint: Study the proof of prop.11.10 carefully and you'll see that you can use it with small alterations.

Written assignment 2:
Use everything up-to and including B/G prop.11.10 PLUS all of B/G prop.11.20 and B/G prop.11.21 to prove the following: Let $m, n \in \mathbb{Z} \setminus \{0\}$. Then $(m/n)\sqrt{2}$ is irrational.