Math 330 Section 4 - Fall 2021 - Homework 11

Published: Wednesday, October 20, 2021 *Running total:* 44 *points*
Last submission: Friday, November 5, 2021

Status - previously assigned reading Assignments:

B/G (Beck/Geoghegan) Textbook:
ch.1-7 (until Theorem 7.17), ch.8-9

MF lecture notes:
ch.2-3, ch.4 (skim), ch.5-8, ch.9 until before Definition 9.12 (Continuity in $\mathbb{R}$)

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)

New reading assignments:

Reading assignment 1 - due: Monday, October 25:

- **a.** Read carefully the remainder of MF ch.9.3.
- **b.** Read carefully MF ch.9.4. It is rather lengthy.
- **c.** Read carefully MF ch.9.5. It should be a quick and easy read.

Reading assignment 2 - due: Wednesday, October 27:

- **a.** Read carefully MF ch.9.6.
- **b.** Read carefully MF ch.9.7.

Reading assignment 3 - due Friday, October 29:

- **a.** Read carefully B/G ch.10. It gives you another perspective on MF ch.9.1–9.3
- **b.** Read carefully B/G ch.11.1 and 11.2. Skim ch.11.3. Most of that material was dealt with in MF ch.9.4–9.6.

Written assignments:

Written assignment 1: Prove the following part of thm.8.1 (De Morgan's Law):

If $(A_\alpha)_{\alpha\in I}$ is a family of sets $A_{\alpha\in\Omega}$ then $\left(\bigcap_\alpha A_\alpha\right)^{\complement} \subseteq \bigcup_\alpha A_\alpha^{\complement}$.

Written assignment 2: Prove cor.8.1: If $X, Y \neq \emptyset$ and $A \subseteq X$ and $f : X \to Y$ then $f^{-1}(f(A)) \supseteq A$.

Written assignment 3: Prove the "$\supseteq$" part of prop.8.8:

If $X, Y \neq \emptyset$ and $B \subseteq Y$ and $f : X \to Y$ then $f(f^{-1}(B)) \supseteq B \cap f(X)$.