Math 330 Section 5 - Fall 2023 - Homework 04

Published: Monday, September 4, 2023 *Running total:* 18 *points*
Last submission: Friday, September 22, 2023

Status - Reading Assignments:

Here is the status of the reading assignments you were asked to complete before the first one of this HW.

Here is the status of the reading assignments you were asked to complete before the first one of this HW.

MF lecture notes:
ch.2.1 – 2.4, ch.3, skim ch.4 (optional), ch.5 – ch.5.2.3

B/G (Beck/Geoghegan) Textbook:
ch.1 – 2.2, ch.3

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, September 11:

- **a.** Read very carefully MF ch.5.2.4 and ch.5.2.5. This is bound to show up on the first midterm!

Reading assignment 2 - due: Wednesday, September 13:

- **a.** Read very carefully the remainder of MF ch.5.2. You already have learned to work with families.

Reading assignment 3 - due Friday, September 15:

- **a.** Review the footnote in the proof of Proposition 5.8 (every surjective function g has a right inverse f, i.e., $g \circ f = id$.)
- **b.** The strong students are encouraged to make sense of the optional chapter 5.3. I will talk very little about the material of this chapter, mostly about the axiom of choice.

Written assignments are on the next page.

General note on written assignments: Unless expressly stated otherwise, to prove a proposition or theorem you are allowed to make use of everything in the book up to but NOT including the specific item you are asked to prove.

Written assignment 1: Use anything before Proposition 3.56 to prove the following part of Proposition 3.56:

Let $(R, \oplus, \odot, P)$ be an ordered integral domain. Let $A \subseteq R$. If A has a minimum then it also has an infimum, and $\min(A) = \inf(A)$.

Written assignment 2: Use the rules of working with quantifiers to negate the following statement (see B/G ch.3.3). No need at all to understand the meaning of this statement. [1]

$\forall\, \alpha > 0\ \exists\, \beta > 0$ such that $\forall\, x \in N_\beta(z)$ it is true that $f(x) \in N_\alpha(f(z))$.

[1] You will learn later in this course that this is the definition of continuity of a function $x \mapsto f(x)$ at a point z in the domain of f.