Math 330 Section 7 - Spring 2019 - Homework 04

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Status - Reading Assignments:

Here is the status of the reading assignments you were asked to complete so far (incl. hwk 2):

B/G (Beck/Geoghegan) Textbook:
Preface and ch.1 – ch.2

MF lecture notes:
ch.1 – ch.3

B/K lecture notes (optional but **very useful for hwk 3**):
ch.1.1 (Introduction to sets)
ch.1.2 (Introduction to Functions) but skip ch.1.2.4: Floor and Ceiling Functions

New reading assignments:

Reading assignment 1 - due Monday, February 4:

a. Read extra carefully B/G ch.3 on logic. It is very brief but contains many subtleties and is your toolchest for constructing acceptable proofs.
b. Work through B/G project 3.7 which asks you to negate a bunch of statements. It is best to do this in a group! I won't grade your stuff but I'll discuss what you did with you if you come to see me.
b. Reread MF ch.2.4 (Proofs by Induction and Definitions by Recursion). Work through several examples given there and in B/G ch.2.3 (induction).

Reading assignment 2 - due: Wednesday, February 6:

a. Carefully read MF ch.5.1 (Cartesian Products and Relations).
b. Carefully read MF ch.5.2.1 – 5.2.3

Reading assignment 3 - due Friday, February 8:

a. Carefully read MF ch.5.2.4 – 5.2.7

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:
Prove MF prop.3.50.**d**: Let $a, b \in R$. Then $|a \ominus b| \geqq \big||a| \ominus |b|\big|$.

Hint #1: You are allowed to use MF prop.3.51 **even it appears after** prop.3.50.**d**!

Hint #2: first use the triangle inequality on $|a| = |(a \ominus b) \oplus b|$, and then on $|b| = |(b \ominus a) \oplus a|$. See what you get if you replace a with $|a| \ominus |b|$ and b with $|a \ominus b|$.

Written assignment 2:
Prove the following part of MF prop.3.53: Let $(R, \oplus, \odot, P)$ be an ordered integral domain and $\emptyset \neq A \subseteq R$. If A has a maximum then it also has a supremum, and $\max(A) = \sup(A)$.