Math 330 Section 6 - Fall 2020 - Homework 04

Published: Thursday, September 10, 2020   *Running total: 20 points*
Last submission: Friday, September 25, 2020

Status - Reading Assignments:

Here is the status of the reading assignments you were asked to complete by this date.

B/G (Beck/Geoghegan) Textbook:
     ch.1, ch.2.1 - 2.2, ch.3

MF lecture notes:
     ch.2 - 3, ch.5 through ch.5.2.3

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 14:

     a.   Carefully read MF ch.5.2.4 - 5.2.7.
     b.   Carefully read MF 5.2.8 through Remark 5.19. Review the last part of MF ch.2.3 on sequences first!

Reading assignment 2 - due: Wednesday, September 16:

     a.   Carefully read B/G ch.5. You have encountered the material already in MF ch.5.
     b.   Carefully read the remainder of MF ch.5.

Reading assignment 3 - due Friday, September 18:

     a.   Carefully read the remainder of MF ch.6.1 - 6.4.
     b.   Carefully read B/G ch.2.3, in particular the examples.

Written assignment 1:
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.

$\forall \varepsilon > 0 \; \exists \delta > 0$ such that $\forall x \in N_\delta(a)$ it is true that $f(x) \in N_\varepsilon(f(a))$.

Written assignment 2:
One point each for **a** and **b**:

Let $X, Y \neq \emptyset$ and $f : X \to Y$.

a. Prove that $R := \{(x, x') \in X \times X : f(x) = f(x')\}$ is an equivalence relation on X.

b. For the special case $f : \mathbb{R} \to \mathbb{R}; \;\; x \to x^2$ compute the equivalence classes $[2], [0], [-2]$ for this equivalence relation.