

Math 330 Section 6 - Spring 2020 - Homework 10

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Running total: 39 points

Last submission: Friday, March 27, 2020

Update March 22, 2020

Your written assignments must be submitted as .txt files or .xdoc files. If you know how to, you may also submit them as LaTeX files. In that case I want you to submit the .tex source file. I should be able to run your xyz.tex file as "pdflatex xyz". You can find a link to the instructions on the Homework page.

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 – 11 (ch.7.2 until thm.7.17),

MF lecture notes:

ch.2, ch.3, ch.5 – 9

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)

Reading assignment 1 - due Monday, March 16:

- a. Read B/G ch.12. You have already encountered the material in MF ch.9 about the real numbers.
- b. Carefully read MF ch.10. Skip the proof of lemma 10.1 (and of course the alternate proof of thm.10.2).

Reading assignment 2 - due: Wednesday, March 18:

- a. Read B/G ch.13. You have encountered all of the material except for ch.13.5 (Nondescribable Numbers). You will not be tested on that last subchapter.
- b. Read MF ch.11.1. You should know the material if you are taking or have taken Math 304 or Math 323. You will not be tested on that material.

Reading assignment 3 - due Friday, March 20:

- a. Read MF ch.11.2.1. You should know the examples if you are taking or have taken Math 304. You will not be tested on that material.
- b. Read MF ch.11.2.2 extra carefully! It is a core chapter and you WILL be tested on that one. You will have problems understanding it if you do not understand the earlier material of ch.11.

Written assignments:

New policy:

Your written assignments must be submitted as .txt files or .xdoc files. If you know how to, you may also submit them as LaTeX files. In that case I want you to submit the .tex source file. I should be able to run your xyz.tex file as "pdflatex xyz". You can find a link to the instructions on the Homework page.

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

Let $\{A_i : i \in I\}$ be a family of subsets of a universal set S . Then

$$\left(\bigcup_i A_i \right)^c \subset \bigcap_i (A_i^c)$$

Written assignment 2: Prove (9.14) of prop.9.10: Let A, X be nonempty, and let $A \subset X$.

Let $F, G : X \rightarrow \mathbb{R}$. Prove that

$$\inf \{ F(x) + G(x) : x \in A \} \geq \inf \{ F(y) : y \in A \} + \inf \{ G(z) : z \in A \}$$

without applying formula (9.13) to $-F$ and $-G$.

Big hint: Examine the proof of (9.13) and follow it as closely as possible!