

Math 330 Section 5 - Spring 2018 - Homework 02

Published: Thursday, January 18, 2018

Running total: 7 points

Last submission: Friday, March 2, 2018

Status - Reading Assignments:

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

B/G (Beck/Geoghegan) Textbook:
all of ch.1.

MF lecture notes:
ch.1; ch.2.1 – 2.3; ch.3

New reading assignments:

Reading assignment 1 - due Monday, January 22:

- a. The following parts of the B/K lecture notes are an easy read which covers some the properties of sets and functions.
 - ch.1.1 (Introduction to sets) (optional)
 - ch.1.1 (Introduction to sets) (optional) ch.1.2 (Introduction to Functions) but skip ch.1.2.4: Floor and Ceiling Functions
- b. Read carefully B/G ch.2.1 and ch.2.2

Reading assignment 2 - due: Wednesday, January 24:

- a. Read extra carefully B/G ch.2.3 (Induction).
- b. Read carefully MF ch.2.4 (Proof by Induction).

Reading assignment 3 - due Friday, January 26:

- a. Read carefully B/G ch.2.4 up to and including prop.2.33. You can skip the remainder of ch.2 which talks about the greatest common divisor $\gcd(m, n)$ as the minimum of a certain set.
- c. Read carefully B/G ch.3 on some points of logic. It is short but extremely important!

General note on reading assignments from the B/G book: Ch.17 (Appendix: Addenda to Beck/Geoghegan's "The Art of Proof") of the MF doc contains some explanations, corrections, and generalizations to the material of the B/G book. You are from now on expected to **read those parts of MF ch.17 that correspond to your B/G reading assignments:** Read MF ch.17.1 which contains notes about B/G ch.1 and MF ch.17.2 and 17.3 which contain notes about B/G ch.2 and ch.3 as the first three chapters of B/G have already been assigned to you for reading. The latest version 2018-01-20 of the MF doc contains some additions to the parts of ch.17 which cover B/G ch.1 and 2!

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 everything up to AND including B/G prop.2.2 to prove B/G prop.2.3: $1 \in \mathbb{N}$.

Hint: This is an **indirect proof!** Part of it: Show that you cannot have $-1 \in \mathbb{N}$. **Why** will this help you?

Written assignment 2:

Use everything up to AND including prop.2.4, to prove that if $k \in \mathbb{Z}$ then $k + 1 > k$.

Hint: Use prop.2.3.

GOOD NEWS: When you do assignments from chapter 2 and later chapters you need no longer justify the rules of arithmetic given to you in ch.1. No more worry about commutativity of “+” and “.” and the need for parentheses to group more than two terms. You may even use the “general laws of associativity”: Given any finite sum of integers such as $(m_1 + m_2) + (n_1 + n_2)$ you may regroup the parentheses and even drop them. The same is true for products.