

Math 330 Section 1 - Spring 2026 - Homework 07

Published: Tuesday, February 17, 2026
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Running total: 30 points

Status - Reading Assignments:

The reading assignments you were asked to complete before the first one of this HW are:

MF lecture notes:

ch.1 - ch.3, skim ch.4, ch.5.1 - ch.6.11

B/G (Beck/Geoghegan) Textbook:

ch.2.1 – 5, ch.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)

New reading assignments:

Reading assignment 1 - due Monday, February 23:

- Read carefully the remainder of MF ch.6.
- Do a quick review of B/G ch.1. You already have encountered the material in MF ch.3 and ch.6.

Reading assignment 2 - due: Wednesday, February 25:

- Read carefully MF ch.7.1 -7.3.

Reading assignment 3 - due Friday, February 27 (no classes):

- Read carefully the remainder of MF ch.7.

Adhere to the usual rules for written assignments!

Written assignment 1:

Prove B/G Prop. 4.7(i) by induction: Let $k \in \mathbb{N}$. Then there exists $j \in \mathbb{Z}$ such that $5^{2k} - 1 = 24j$. In other words, $24 \mid (5^{2k} - 1)$.

Written assignment 2:

Prove MF Prop. 6.7(a) by induction on p : Let $(x_j)_{j \in \mathbb{N}}$ be a sequence in an ordered integral domain $R = (R, \oplus, \odot, P)$, and let $m, n, p \in \mathbb{Z}$ be indices such that $m \leq n < p$. Then

$$\sum_{j=m}^p x_j = \sum_{j=m}^n x_j \oplus \sum_{j=n+1}^p x_j.$$

Hints: Think carefully about the base case: If $m = 5$ and $n = 8$, how would you choose p ? If $m = -4$ and $n = 8$, how would you choose p ? For general $m \leq n$, how would you choose p ?