

## Math 330 Section 7 - Spring 2019 - Homework 09

*Published: Thursday, February 28, 2019*  
*Last submission: Monday, March 25, 2019*

*Running total: 36 points*

### **Update March 11, 2019**

<i>Deadline extended from Friday, March 15, 2019</i>
--

### **Status - Reading Assignments:**

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

### **Status - Reading Assignments:**

Here is the status of the reading assignments you were asked to complete so far:

B/G (Beck/Geoghegan) Textbook:  
Preface and ch.1 – ch.6, ch.7.1

MF lecture notes:  
ch.1 – ch.3; ch.5 – ch.7 (skim ch.6.3); ch.19.7(!)

B/K lecture notes:  
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, March 4:**

- a. Read carefully MF ch.8.1 – 8.2. You may skip ch.8.3, but look at the trivial formulas **2.b** – **2.g** of prop.8.3. They are true for any sets  $A, B, C \subseteq \Omega$ . and worthwhile remembering!

#### **Reading assignment 2 - due: Wednesday, March 6:**

- a. Read carefully MF ch.9.1 through prop.9.7. Everything later in that chapter might be referenced, but you are not expected to remember any of it.

#### **Reading assignment 3 - due Friday, March 8:**

- a. Read carefully the remainder of MF ch.9 (i.e., ch.9.2).

**Written assignments:**

**Written assignment 1:** MF Exercise 6.2: Prove prop.6.8 on p.141 of this document:

Let  $q \in \mathbb{Z}$ . If  $n \in \mathbb{Z}_{\geq 0}$  then  $(1 - q) \sum_{j=0}^n q^j = 1 - q^{n+1}$ .

**Hint:** Prove the case  $q \neq 1$  by induction on  $n$  and handle the case  $q = 1$  separately.

**Written assignment 2:** Prove prop.6.38 (B/G prop.6.31: Euclid's Lemma for Two Factors):

Let  $p$  be prime and  $m, n \in \mathbb{N}$ . If  $p \mid (mn)$  then  $p \mid m$  or  $p \mid n$ .

**Hint:** Assume that  $p \nmid m$  and show that this implies  $p \mid n$ . For that use lemma 6.3 and properties of the gcd.