# Math 447 - Spring 2024 - Homework 01

Published: Tuesday, January 16, 2024

**Status - Reading Assignments:**

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

WMS (Wackerly, et al. Textbook):

Nothing assigned yet

MF447 lecture notes:

Nothing assigned yet

Other:

Nothing assigned yet

**New reading assignments:**

**Reading assignment 1 - due Wednesday, January 17 (FIRST DAY OF LECTURE!):**

- **a.** Review my entire course site. You will find the syllabus (only!) on BrightSpace, but you should get used to go to THIS LINK instead. Only there you can find, e.g., the homework assignments. I will discuss only some parts of that website on the first day of lecture!
- **b.** Review MFCh.1.1 so you understand the format of my lecture notes, including what material is optional and thus will not be part of any graded assignment.
- **c.** Carefully read MF ch.1.2 through Example 1.2. The entire chapter 1 is denoted "preliminary", but you will have issues to understand the more formal presentation of probability concepts which begin in chapter 3.

It is really important for the WMS reading assignments that you work through the examples!

**Reading assignment 2 - due Friday, January 19:**

- **a.** Carefully read the remainder of MF ch.1.
- **b.** Review MF ch.2.1 – 2.3. Most of the content will be familiar to you from your calculus sequence, but quite a bit of the notation may be unfamiliar to you. For example, I write $[8, 28]_{\mathbb{Z}}$ to denote the set $\{8, 9, 10, \ldots, 27, 28\}$.

**Written assignments - Not collected for grading:**

Remember that **some of those assignments will be relevant for the quizzes and exams.**

- **(a)** Use MF Example 1.2 as a template to figure out what happens when you consider the roll of two dice. Then compare what you have with MF Example 1.3. and Proposition 2.1.
- **(b)** MF ch.2.1 (sets): Draw Venn diagrams for the formulas of Remark 2.4 and Example 1.2.

**(c)** MF ch.2.1: Is any of the following a partition of $[0, \infty[$?

• **(c.1)** $\mathscr{A} := \{]k, k+2[ : k = 0, 2, 4, \dots\}$ • **(c.2)** $\mathscr{B} := \{]k, k+2] : k = 0, 2, 4, \dots\}$

• **(c.3)** $\mathscr{C} := \{[k, k+2[ : k = 0, 2, 4, \dots\}$ • **(c.4)** $\mathscr{D} := \{[k, k+2] : k = 0, 2, 4, \dots\}$

**(d)** MF ch.2.2: True or false?

• $\forall\, y \in \mathbb{Z}\ \ y + 5 \in \mathbb{Q}$ ___ • $\forall\, y \in \mathbb{Q}\ \ y + 5 \in \mathbb{Z}$ ___

• $\exists\, y \in \mathbb{Z}$ s.t. $\ y + 5 \in \mathbb{Q}$ ___ • $\exists\, y \in \mathbb{Q}$ s.t. $\ y + 5 \in \mathbb{Z}$ ___

• $\exists!\, y \in \mathbb{Z}$ s.t. $\ y + 5 \in \mathbb{Q}$ ___ • $\exists!\, y \in \mathbb{Q}$ s.t. $\ y + 5 \in \mathbb{Z}$ ___

• x is a rose $\Rightarrow$ x is a flower ___ • x is a flower $\Rightarrow$ x is a plant ___

• x is a flower $\Leftrightarrow$ x is a plant ___

• $x + y = 12 \ \Rightarrow\ x + y = 6 + 6$ ___ • $x + y = 6 + 6 \ \Rightarrow\ x + y = 12$ ___

• $x + y = 6 + 6 \ \Leftrightarrow\ x + y = 12$ ___

**(e)** Check those numbers that are elements of $\mathbb{Q}$.

$-\frac{13}{8}$ ___ $\frac{24}{8}$ ___ $0.3$ ___ $3.0$ ___ $-13$ ___ $16.6\bar{6}$ ___ $16.66\bar{6}6$ ___

$-\sqrt{2}$ ___ all $x \in \mathbb{N}$ ___ all $x \in \mathbb{R}$ ___ all $x \in \mathbb{Z}$ ___

**Selected answers:**

**(c)** Only $\mathscr{C}$ is a partition of $[0, \infty[$.

**(d)** MF ch.2.2: True or false?

• $\forall\, y \in \mathbb{Z}\ \ y + 5 \in \mathbb{Q}$ **True** • $\forall\, y \in \mathbb{Q}\ \ y + 5 \in \mathbb{Z}$ **False**

• $\exists\, y \in \mathbb{Z}$ s.t. $\ y + 5 \in \mathbb{Q}$ **True** • $\exists\, y \in \mathbb{Q}$ s.t. $\ y + 5 \in \mathbb{Z}$ **True**

• $\exists!\, y \in \mathbb{Z}$ s.t. $\ y + 5 \in \mathbb{Q}$ **False** • $\exists!\, y \in \mathbb{Q}$ s.t. $\ y + 5 \in \mathbb{Z}$ **False**

• x is a rose $\Rightarrow$ x is a flower **True** • x is a flower $\Rightarrow$ x is a rose **False**

• x is a flower $\Leftrightarrow$ x is a rose **False**

• $x + y = 12 \ \Rightarrow\ x + y = 6 + 6$ **True** • $x + y = 6 + 6 \ \Rightarrow\ x + y = 12$ **True**

• $x + y = 6 + 6 \ \Leftrightarrow\ x + y = 12$ **True**

**(e)** Check those numbers that are elements of $\mathbb{Q}$.

$-\frac{13}{8}$ ✓ $\frac{24}{8}$ ✓ $0.3$ ✓ $3.0$ ✓ $-13$ ✓ $16.6\bar{6}$ ✓ $16.66\bar{6}6$ ✓

$-\sqrt{2}$ ___ all $x \in \mathbb{N}$ ✓ all $x \in \mathbb{R}$ ___ all $x \in \mathbb{Z}$ ✓