Math 447 - Fall 2024 - Homework 01

Published: Tuesday, August 20, 2024

Status - Reading Assignments:

Here are the reading assignments you were asked to complete before the first one of this HW.

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, August 21 (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. That is a very easy read of about $4\frac{1}{2}$ pages. 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.

Reading assignment 2 - due Friday, August 23:

- **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 are on the next page.

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 rose ___

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

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

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

(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 $x \in \mathbb{Z}$ ✓