HOMEWORK #1: MATH 173, FALL 2022

ALEX IOSEVICH

1. Problems not in the book

Problem #1: Consider the sequence defined as follows. Let $x_1 = 2$ and let

$$x_{n+1} = \frac{x_n}{2} + \frac{1}{x_n}.$$

Prove that $\lim_{n\to\infty} x_n$ exists and equals $\sqrt{2}$.

Problem #2: i) Let $A = \{apple, pear, orange, cherry, grape\}$. Create an addition and multiplication table for A that makes it into a field. Check carefully that all the field axioms hold.

ii) **Extra credit:** Prove that a set of size $n \ge 2$ can be made into a field with a suitable addition and multiplication tables if and only if n is a power of a prime.

2. PROBLEMS FROM THE BOOK

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Section 1.2, problems 1,4,6,7,8

Section 1.3, problems 2,3,4,6,8