Problem of the Week

Problem 5 (due on Monday, November 7)

Let $\mathcal{F}$ be the set of all functions $f: \mathbb{R} \rightarrow \mathbb{N}$ from the real numbers to natural numbers. Prove that there exist a sequence of functions $f_1, f_2, f_3, \ldots$ in $\mathcal{F}$ such that for every finite set $A \subseteq \mathbb{R}$ and every $g \in \mathcal{F}$ there is $i$ such that $g(a) = f_i(a)$ for every $a \in A$.

Overview

Every other Monday (starting 08/29/22), we will post a problem to engage our mathematical community in the problem solving activity and to enjoy mathematics outside of the classroom. Students (both undergraduate and graduate) are particularly encouraged to participate as there is no better way to practice math than working on challenging problems. If you have a solution and want to be a part of it, e-mail your solution to Marcin Mazur (mazur@math.binghamton.edu) by the due date. We will post our solutions as well as novel solutions from the participants and record the names of those who’ve got the most number of solutions throughout each semester.

When you submit your solutions, please provide a detailed reasoning rather than just an answer. Also, please include some short info about yourself for our records.

Previous Problems and Solutions

- **Problem 4** Solution received from
- **Problem 3** Solution received from Prof. Vladislav Kargin.
- **Problem 2** Solved by Prof. Vladislav Kargin and Ashton Keith.
- **Problem 1** Solution submitted by Simon Bange, Ezra Dryer, Garrett Gramzow, Xi Li, Prakash Singh.
- **Spring 2022**
- **Fall 2021**
- **Spring 2021**
- **Fall 2020**
- **Summer Challenge**
- **Spring 2020**