Problem of the Week

Problem 2 (due Monday, September 28)

Let \( \mathbb{N}_0 \) be the set \( \{0,1,2,\ldots\} \) of all non-negative integers. Find all functions \( f: \mathbb{N}_0 \rightarrow \mathbb{N}_0 \) such that

\[
f(a^2 + b^2) = f(a)^2 + f(b)^2
\]

for all \( a, b \) in \( \mathbb{N}_0 \).

Overview

Every other Monday (starting 08/31/20), we will post a problem to encourage students (both undergraduate and graduate) to enjoy mathematics outside of the classroom and engage our mathematical community in the problem solving activity. 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 solutions (from us) as well as novel solutions from 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

- **Problem 1** Solved by
- **Summer Challenge**
- **Spring 2020**