MAT-255– Number Theory Spring 2024 In Class Work January 24

Your Name: _____ Group Members: _____ _____

Problem 1 *Let n be a positive integer with $n \neq 1$. Prove that if n^2+1 is prime, then n^2+1 can be written in the form $4k+1$ with $k \in \mathbb{Z}$.*

Problem 2 *Prove or disprove the following conjecture, which is similar to the Twin Prime Conjecture:*

Conjecture 1. *There are infinitely many prime number p for which $p+2$ and $p+4$ are also prime numbers.*

Wait for more lecture before answering the problem on the back.

Problem 3 *Without looking up the proof, prove Proposition 1.10: Let $a, b \in \mathbb{Z}$ with $(a, b) = d$. Then* $\left(\frac{a}{d}, \frac{b}{d}\right) = 1$.