

HW2

This is due Friday Feb. 15

1. Find all positive integers x such that $13|x^2 + 1$.
2. If p is prime and $a^2 \equiv b^2 \pmod{p}$, then $a \equiv b \pmod{p}$ or $a \equiv -b \pmod{p}$.
3. If $(a, m) = 1$ then
 - a) Show that there is b such that $ab \equiv 1 \pmod{m}$. Also show that $(b, m) = 1$.
Let r_1, \dots, r_s be a reduced system mod p (p is a prime number).
 - b) Find s .
 - c) Show that $r_1 \dots r_s \equiv -1 \pmod{p}$
4. Show that if $(a, b) = 1$ then $(a + b, a^2 - ab + b^2) = 1$ or 3 .
(Hint: first use properties of G.C.D to simplify $(a + b, a^2 - ab + b^2) = 1$)
5. Using calculator find all solutions of $101x + 99y = 437$