Dr. Marques Sophie
Office 519

Number theory

Fall Semester 2013
marques@cims.nyu.edu

Quizz #4

Due Friday december 6 in recitation.

Problems:

1. Determine if the congruence $x^2 \equiv 3 \; mod \; 53$ has a solution.
2. Prove that the Diophantine equation $x^2 + 7y^2 = 138$ has no solutions. (Hint: consider modulus $m = 4$).
3. Symplify the following expression in $\mathbb{Z}[i]$, $(3 + 2i)(3 - i)^2$
4. Does $2 + i$ divide 15 ?
5. The continued fraction expansion of $\sqrt{7}$ is $[2, \overline{1, 1, 1, 4}]$. Find TWO positive solutions $(x > 0, y > 0)$ to $x^2 - 7y^2 = 1$. (Hint: partial convergents).