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. Simplify 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 $[2, 1, 1, 1, 4]$. Find TWO positive solutions $(x > 0, y > 0)$ to $x^2 - 7y^2 = 1$. (Hint: partial convergents).