Fall 2019 COT 3100 Section 1 Quiz #2 Chapter 4: Number Theory

Name: _____

Lab Section: 18(R9) 19(R10) 20(R11) 21(T2) 22(T3) 23(T4) 24(T5)

1) (15 pts)

(a) (10 pts) Find one ordered pair of integers (x, y) that satisfies the equation $137x + 49y = 1$.

(b) (3 pts) Using your work from part (a), determine $49^{-1} \bmod 137$. Please give an answer in between 0 and 136, inclusive.

(c) (2 pts) Using your work from part(a), list the set of all ordered pairs of integers (x, y) that Satisfy the equation $137x + 49\ y = 1$.

Please clearly mark each of your final answers with a box around each answer, and clearly indicate which of the three parts each answer is for.

2) (10 pts) Let a be an integer such that $a \equiv 3 \pmod 8$. Prove that $a^2 \equiv 9 \pmod{16}$. (Hint: Use the mod equation to express a in terms of another integer, and then use this when substituting for a^2, reducing the expression using the rules of mod, under mod 16.)