

MA1971

Name: _____

Quiz 4

D Term, 2015

Show all work needed to reach your answers.

1. (10 points) Please complete the following multiplication table for $\mathbb{Z}_{11}$ (multiplication mod 11), then complete the list of equivalence classes of the form $\{x, -x, \bar{x}, -\bar{x}\}$

$\times$	0	1	2	3	4	5	6	7	8	9	10
0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10
2	0	2	4	6	8	10	1	3	5	7	9
3	0	3	6	9	1	4	7	10	2	5	8
4	0	4	8	1	5	9	2	6	10	3	7
5	0	5	10	1	5	9	3	7	2	6	10
6	0	6	1	5	9	3	8	2	6	10	4
7	0	7	3	10	2	6	10	4	8	2	6
8	0	8	5	2	6	10	4	8	2	6	10
9	0	9	7	4	1	5	3	7	10	3	7
10	0	10	9	8	7	6	5	4	3	2	1

$$\mathbb{Z}_{11} = \{0\} \cup \{1, \underline{\quad}\} \cup \{2, \underline{\quad}, \underline{\quad}, \underline{\quad}\} \cup \{\underline{\quad}, \underline{\quad}, \underline{\quad}, \underline{\quad}\}$$

2. (10 points) If $x, y \in \mathbb{Z}^+$ with x even and y odd, please show that $x^2 + y^2 = 1(\text{mod } 4)$.