Mat 320 - Stout Name:_____

QUIZ 3: ABSTRACT ALGEBRA

Problem 1. Fill in the Cayley table below for the group $(\mathbb{Z}_8, \oplus)$ where $x \oplus y$ represents $(x + y)$ mod 8.

$\oplus$	0	1	2	3	4	5	6	7
0	0	1	2	3	4	5	6	7
1	1	2	3	4	5	6	7	
2	2	3	4	5	6	7		1
3	3	4	5	6	7		1	
4	4	5	6	7		1		3
5	5	6	7		1		3	
6	6	7		1		3		5
7	7		1		3		5	6

Problem 2. Fill in the Cayley table below for the monoid $(\mathbb{Z}_5, \otimes)$ where $x \otimes y$ represents (x$\cdot y$) mod 5.

$\otimes$	0	1	2	3	4
0	0	0	0	0	0
1	0	1	2	3	4
2	0	2		1	
3	0		1		2
4	0	4	3	2	

Problem 3. Let $S = \{-1, 1\}$. Define a binary operation $*$ on S by the usual notion of multiplication of numbers. Is $(S, *)$ a group? If so, fill in the Cayley table below.

$*$		