

# MATH 323 Section 2

## QUIZ 7

April 22<sup>nd</sup>, 2013

Your Name: \_\_\_\_\_

Consider the set  $\{a, b, c, d\}$  with the following operations:

| + | a | b | c | d |
|---|---|---|---|---|
| a | c | d | a | b |
| b | d | c | b | a |
| c | a | b | c | d |
| d | b | a | d | c |

| · | a | b | c | d |
|---|---|---|---|---|
| a | a | a | c | c |
| b | a | b | c | d |
| c | c | c | c | c |
| d | c | d | c | d |

a. There does exist an additive identity (0) and multiplicative identity (1). Find them both.

b. Show that the set with these two operations is not a field by showing there exists a nonzero element without a multiplicative inverse.

Answers:

- We can see that  $c = 0$  and  $b = 1$ .
- We see that for  $a$  and  $d$ , neither is 0 and also neither has another number whose product with it gives  $b$ .