Math 5370 **ALGEBRAIC STRUCTURES** Spring 2020
Dr. Duval **Homework 1**
due Thursday, January 30

1. Part of the multiplication table for the group $G = \{a, b, c, d, e\}$ is given below. Complete the table.

$\times$	a	b	c	d	e
a			a		
b					
c					
d				b	
e					a

2. Determine whether the set

$$\{[1], [3], [7], [9]\} \subseteq \mathbf{Z}_{10}$$

is a group with operation multiplication, and justify your answer.

3. Let P denote the set of polynomials in x of degree at most 1 (so the set of polynomials of the form $ax + b$, where a and b may be any real number). Determine whether P is a group with the operation **addition**, and justify your answer. Then determine whether P is a group with the operation **multiplication**, and justify your answer.

4. Let G be a group, and let $a, b, c \in G$. Prove that the equation $axb = c$ has a **unique** solution x.