Introduction to mathematical cryptography
Homework problems
Week 2

3. Let $A = \{a, b, c, d, e, f, g, h\}$, and define the operation $*$ as

$$x * y = x,$$

for any $x, y \in A$. Decide if $(A, *)$ is associative or not, has a unit element or not.

4. Assume $(G, *)$ is a group, and $a, b, c \in G$. Prove that there exists a unique $x \in G$ such that

$$a * x * b = c.$$

Note: Please, provide complete arguments everywhere, and explain how you arrived at your answer/solution. Giving the result without explanation leads to score deduction.