Tarea I

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1. Grupos

1.3

Let S be a set with an associative law of composition and with an identity element. Prove that the subset of S consisting of the invertible elements is a group.
Dem: Primero, la identidad pertenece al conjunto de los invertibles:

$$e \circ e = e \quad \text{/Por definicin de la identidad}$$

$\therefore$ La operacin es asociativa por definicin.
Clausura sobre el subconjunto:
Se asume que existen elementos invertibles a y b, tal que $a \circ b$ no es invertible.

$$\begin{gathered}(a \circ b) \circ b^{-1} = a \quad \text{Asociatividad e invertiblidad de } b \\ \big((a \circ b) \circ b^{-1}\big) \circ a^{-1} = e \\ (a \circ b) \circ \big(b^{-1} \circ a^{-1}\big) = e \\ \implies a \circ b \text{ es invertible} \\ \implies \circ \text{ es cerrado sobre los invertibles}\end{gathered} \tag{1}$$

Esto implica que los invertibles de S son un grupo.

1.11

Let G be a group with multiplication notation, we define an opposite group G° wirh law of composition $a \circ b$ as follows: The underlying set is the same as G, but the law of composition is the opposite, that is, we define $a \circ b = ba$.
Prove that this defines a group.