

8. Consider $L = \{n \in \mathbb{Z} \mid n \leq 7\}$. For a and b in L , define $a * b = \min\{a, b\}$. Does $(L, *)$ have an identity element? If yes, what is it and why does it work? If no, why not? (I know that $(L, *)$ is not a group. You do not have to show that, but you do have to answer my question.)

yes 7 is the identity element of $(L, *)$.

If n is any element of L , then n is an integer with $n \leq 7$

$$\text{So } n * 7 = \min\{n, 7\} = n$$

$$\text{and } 7 * n = \min\{7, n\} = n$$