1. (10 points) Show that the set \( \{0, 1\} \times [n] \) has cardinality 2\( n \).
2. (10 points) Let us consider group theory, it is a theory with undefined terms: group-element and times (if \( a \) and \( b \) are group elements, we denote \( a \) times \( b \) by \( a \cdot b \)), and axioms:

1. \((a \cdot b) \cdot c = a \cdot (b \cdot c)\) for every group-elements \( a, b, \) and \( c \);
2. there is a unique group-element \( e \) such that \( e \cdot a = a = a \cdot e \) for every group-element \( a \) (we say that such an element is the identity element);
3. for every group-element \( a \) there is a group-element \( b \) such that \( a \cdot b = e \), where \( e \) is the identity element;
4. for every group-element \( a \) there is a group-element \( b \) such that \( b \cdot a = e \), where \( e \) is the identity element.

Let \( e \) be the identity element. Show the following statements

- if \( b_0 \cdot a = b_1 \cdot a = e \), then \( b_0 = b_1 \), for every group-elements \( a, b_0, \) and \( b_1 \).
- if \( a \cdot b_0 = a \cdot b_1 = e \), then \( b_0 = b_1 \), for every group-elements \( a, b_0, \) and \( b_1 \).
- if \( a \cdot b_0 = b_1 \cdot a = e \), then \( b_0 = b_1 \), for every group-elements \( a, b_0, \) and \( b_1 \).