

## Exercises

3.277 [05R] Let  $X$  be a non-empty set, and  $A \subseteq X$ . We will denote with  $A^c = X \setminus A = \{x \in X : x \notin A\}$  the complement of  $A$  in  $X$ .

We define the characteristic function  $\mathbb{1}_A : X \rightarrow \mathbb{Z}$  by

$$\mathbb{1}_A(x) = \begin{cases} 1 & \text{if } x \in A \\ 0 & \text{if } x \notin A \end{cases} .$$

Prove that

$$\mathbb{1}_{A^c} = 1 - \mathbb{1}_A \quad , \quad \mathbb{1}_{A \cap B} = \mathbb{1}_A \mathbb{1}_B \quad , \quad \mathbb{1}_{A \cup B} = \mathbb{1}_A + \mathbb{1}_B - \mathbb{1}_A \mathbb{1}_B$$