EXERCISES OF WEEK ONE

Exercise 1. Find the generalized union and intersection of the collection

$$G := \big\{[0, 1 + 1/n) \mid n \geq 1\big\}.$$

Exercise 2. Show that the following inclusion

$$(A - B) \cap (A - C) \subseteq A - (B \cup C)$$

holds (start with the usual sentence "Let $x \in \ldots$").

Exercise 3. Let R be the following equivalence relation in $\mathbb{N}$

$$nRm \Leftrightarrow 2 \mid n - m^1.$$

What is $\#(\mathbb{N}/R)$?

Exercise 4. Let P be the power set of the set of real numbers. We have the following function

$$f \colon P \to P, \quad f(A) = A \cap [0, 1]$$

Is f injective? is f surjective?

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[1] given $n \in \mathbb{N}$, the notation $2 \mid n$ means that there exists $a \in \mathbb{N}$ such that $n = 2a$