

EXERCISES OF WEEK THREE

Exercise 1. Let A be a set and 2^A be the power set. Find

$$\cup(2^A), \quad \cap(2^A).$$

Exercise 2. Using the Additive Axioms, show that the inverse with respect to the sum is unique. That is,

$$(x + y = 0 \wedge x + z = 0) \Rightarrow y = z.$$

Exercise 3. Using the result of **Exercise 2**, show that

- (i) $-1 \cdot a = -a$
- (ii) $-(-a) = a$
- (iii) $-(a + b) = -a + -b$

for every $a, b \in \mathbf{R}$.

Exercise 4. Consider the following subset of $\mathbf{N} \times \mathbf{N}$:

$$(n, m) \in G \Leftrightarrow (n - m)(2n - m) = 0.$$

Check whether G is

- (i) reflexive
- (ii) symmetric
- (iii) transitive.