



# The Bright Side of Mathematics

## Start Learning Sets - Part 1

Propositional Logic  
+  
Naive set theory

Logic  
+  
Axioms of  
set theory

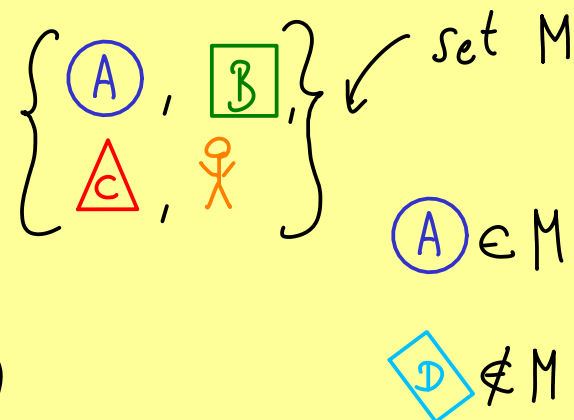
Goal:

doing mathematics

foundation of mathematics

Set: Collection of distinct objects into a whole

Such an object  $x$  inside a set  $M$  is called an element of  $M$ , write:  $x \in M$ .



If  $x$  is not such an object inside the set  $M$ , we write:  $x \notin M$  means:  $\neg(x \in M)$

A set can be defined by giving all its elements:

$$A := \{2, 5, 6\}$$

↑  
defined by

Examples: Empty set:  $\emptyset := \{\}$

Natural numbers:  $\mathbb{N} := \{1, 2, 3, 4, 5, \dots\}$

Natural numbers (including zero):  $\mathbb{N}_0 := \{0, 1, 2, 3, 4, \dots\}$

Integers:  $\mathbb{Z} := \{\dots, -2, -1, 0, 1, 2, \dots\}$

Rational numbers  $\mathbb{Q}$

Real numbers  $\mathbb{R}$

Complex numbers  $\mathbb{C}$

quantifiers  $\forall \exists$  predicates  $x \in \mathbb{N}$