§2.b.a Naive set theory

As already explained in Definition [1x2], in set theory, the connective " \in " is added; given two sets *z*, *y* the formula $x \in y$ reads "*x* belongs to *y*" or more simply "*x* is in *y*", and indicates that *x* is an element of *y*.

It is customary to indicate the sets using capitalized letters as variables.

Definition 2.37. [1Y8]

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Definition 2.38. [227]

It is usual to write $x \notin y$ for $\neg(x \in y)$, $x \notin y$ for $\neg(x \subseteq y)$ and so on.

Remark 2.39. [1W0]

We also define the constant \emptyset , also referred to as {}, which is the empty set,^{†15} that is uniquely identified by the property

 $\forall x, \neg x \in \emptyset \quad .$

Some fundamental concepts are therefore introduced: union, intersection, symmetric difference, power set, Cartesian product, relations, functions *etc*.

Definition 2.40. [1Y2]

Definition 2.41. [1W1]

The power set is defined as in [1Y1].

Definition 2.42. [235]

Exercises

E2.43	[1W6]
E2.44	[1W8]
E2.45	[1W9]
E2.46	[1WB]
E2.47	[1W2]
E2.48	[1WF]
E2.49	[1Y4]
E2.50	[1WC]
E2.51	[24P]

Remark 2.52. [01J]

While in formal theory all the elements of language are sets, in practice we tend to distinguish between the sets, and other objects of Mathematics (numbers, functions, etc etc); for this in the following we will generally use capital letters to indicate the sets, and lowercase letters to indicate other objects.

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^{†15}In Zermelo–Fraenkel axiomatic theory, the existence of \emptyset is an axiom.

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