1 set

 $\underline{\mathbf{def}}$: a set is a collection of objects . objects that form a set are called elements of the set.

 $\underline{\text{Notation}}\text{:}$ we use capital letters to denote sets. We use lower case letters to denote elements.

1.1 Explicitly described sets:

$$\{1,2,-3,1/2\}=S$$
 $\{1,3,\{1,2\}\}\}=T$ $1\in S,\,5\notin S$ Notation: $a\in A$ reads " a is a n elements of A", "a belongs to A" or " a lies in A" $b\notin A$ reads "b is not an element of A" $2\notin T,\{1,2\}\in T$

<u>def</u>: The cardinality of a set S is the number of elements in S.

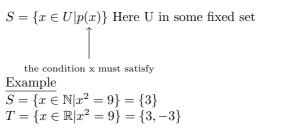
Notation: |S| For how we will only look at the cardinalities of sets with finitely many elements.

$$|S| = 4$$
$$|T| = 3$$

1.2 Standard reserved names for sets:

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\begin{split} \mathbb{N} &= \text{set of natural numbers} = \{1, 2, 3, 4, \ldots\} \\ \mathbb{Z} &= \text{set of integers} = \{0, 1, 2, 3, \ldots\} \\ \mathbb{Q} &= \text{set of rational numbers} \\ \mathbb{R} &= \text{set of real numbers} \\ \mathbb{C} &= \text{set of complex numbers} \\ \emptyset &= \{\} \text{ - set with no elements - the empty set } ||\emptyset| = 0 \\ &= \text{Ex} : A = \{\emptyset, \{\emptyset\}\} \\ &= |A| = 2 \\ &= \emptyset \in A \\ &= \{\emptyset\} \in A \\ &= |\emptyset| = 1 \end{split}
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1.3 Sets described by a property:



1.4 Sets described by a generating formula:

 $S = \{\mathscr{F}(x) | x \in \mathbb{R}\} \text{ where } \mathbb{R} \text{ in some fixed set}$ formula (an expression in X) $\mathbb{Q} = \{\tfrac{a}{b} | a \in \mathbb{Z}, b \in \mathbb{N}\}$ $\mathbb{C} = \{a + bi | a, b \in \mathbb{R}\} \text{ where } i = \sqrt{-1}$