Is $\{\emptyset\}$ an empty set?

Roshan Poudel

Instituto Politécnico de Bragança, Bragança, Portugal

Set

A collection of objects that somehow share a common feature - the elements - is called a set. An element can be aof any nature, depending on the problem under consideration, such as numbers, functions, or lines. A set can be finite or infinite.

Example

1. $A = \{1, 3, 5, 7, 9\}$ is an example of a finite set.
2. $\mathbb{Z}$, the set of the integers, is an example of a finite set.
3. The elements of a set are not only limited to numbers, the elements of a set can be anything,
   $B = \{cow, donkey, rat, horse\}$ is also a set.
4. Sets can also be written in set builder notation:
   $A = \{x \in \mathbb{N} \mid x \geq 4 \text{ and } x \leq 10\}$ which is same as
   $A = \{4, 5, 6, 7, 8, 9, 10\}$

Properties of Set

Properties

1. The order of the elements in a set doesn't matter.
2. If one or more elements of a set are repeated, the set remains the same.
   For example $\{1, 2, 3, 1, 2, 3, 1, 2, 3\}$ is the same as just $\{1, 2, 3\}$.
3. Two sets are considered equal if and only if each element of one set is an element of the other.

Symbol $\in$ is used to to denote that an element belongs to a set. For example : $X = \{a, e, i, o, u\}$ Then, $a \in X$ but $b \notin X$ or $\{a\} \notin X$.

Some important sets

- Some important Sets

Symbol	Name
$\mathbb{Z}$	The set of integers.
$\mathbb{N}$	The set of natural numbers.
$\mathbb{Q}$	The set of rational numbers.
$\mathbb{R}$	The set of real numbers.
$\mathbb{C}$	The set of complex numbers.

- The empty set is a set without any elements, represented by $\{\}$ or $\emptyset$.

- A set with only one element is called a singleton set. For example $X = \{a\}$.

So, Is $\{\emptyset\}$ an empty set?

NO, $\{\emptyset\}$ is not an empty set; it is a singleton set (it has the element $\emptyset$ in it). Empty set is indicated by $\{\}$ or $\emptyset$.