Set notation

In mathematics, a *set* is a collection of objects. We can write a set by using braces. Some sets have a special symbol which is used to represent them.

Here are some examples:

- $\{\text{apple}, \text{orange}, \text{pear}\}$ is a set of fruit
- $\{0, 1, 2\}$ is a set containing three particular integers
- $\mathbb{Z}$ is the set of all integers
- $\mathbb{Q}$ is the set of all rational numbers
- $\mathbb{R}$ is the set of all real numbers
- $\{\}$, sometimes written $\varnothing$, is the *empty set*, the set with no elements

The symbolic notation for "x is in the set of rational numbers" is $x \in \mathbb{Q}$, and similarly for other sets.

Sometimes, we want to say "the set of all numbers which ..."; mathematicians use an extension of the brace notation to write this. For example

$$\{x : x \in \mathbb{R} \text{ and } x^2 < 4\}$$

(read as "the set of x such that x is real and $x^2 < 4$") means the set of all real numbers whose square is less than 4. If it is clear that we are referring to real numbers, this can be abbreviated to $\{x : x^2 < 4\}$.

A useful related notation is interval notation.