Definition of a function

A function transforms a set of values into different values by applying a mapping. **Each member of the set has one corresponding value.**

The input of the function is called the **domain** and the output of the function is called the **range**.

In $f : x \to x - 1$, a domain of $\{-2, -1, 0, 1, 2\}$ will have a range of $\{-3, -2, -1, 0, 1\}$. This is a one-to-one function because each domain value has exactly one range value.

In $f : x \to x^2$, a domain of $\{-2, -1, 0, 1, 2\}$ will have a range of $\{4, 1, 0, 1, 4\}$. This is a many-to-one function because some of the domain values have the same range value.

In $f : x \to \sqrt{x}$, a domain of $\{0, 1, 2\}$ will have a range of $\{0, \pm 1, \pm\sqrt{2}\}$. This is a one-to-many function because some of the domain value have 2 range values. **This is not considered a function**(here).

Finding the range when domain is given

In $f(x) = x^2,\ -2 \leq x \leq 2,\ x \in \mathbb{R}$

The range can be found by substituting the minimum and maximum values.

$0 \leq f(x) \leq 4$