Introduction to functions

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Definition:

A function f assigns to each element x in some set S a unique element in a set T

- The set S is called the **domain** of f or $Dom(f)$
- For x in $Dom(f)$, $f(x)$ is called the image of x under f
- The set of all images $f(x)$ is a subset of T called the image of f, or $Im(f)$

$$Im(f) = f(x) : x \in Dom(f)$$

Some examples

- $f_1(x) = x^2$
- $f_2(x) = \sqrt{(x)}$
- $f_3(x) = log(x)$
- $f_4(x) = sin(x)$

Are you familiar with them?

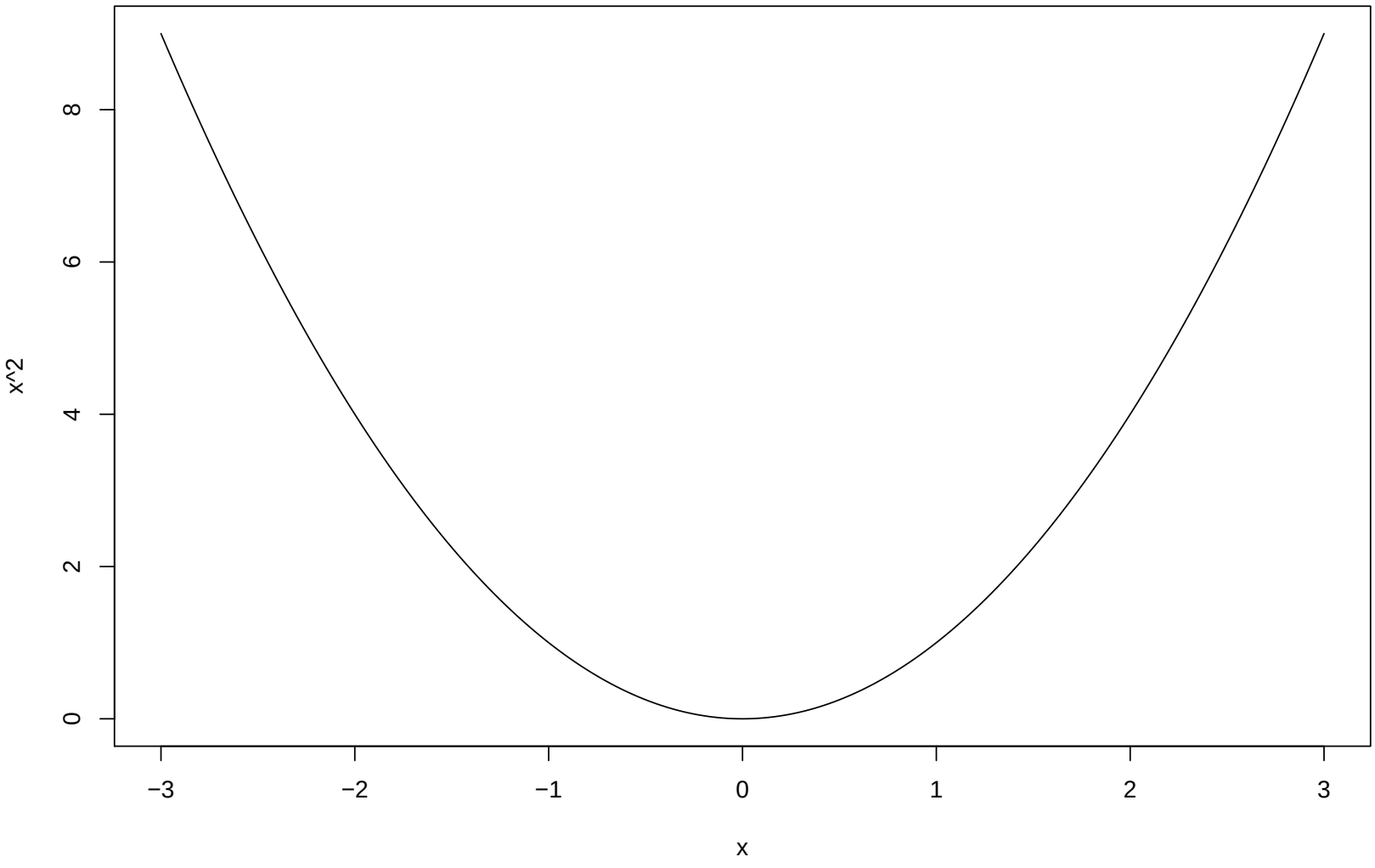
- x is a variable, or input
- $f(x)$ is the output, which has to be uniquely determined!
- You need to know what values of x are allowed

Graphs

The graphical representation of the previous functions are:

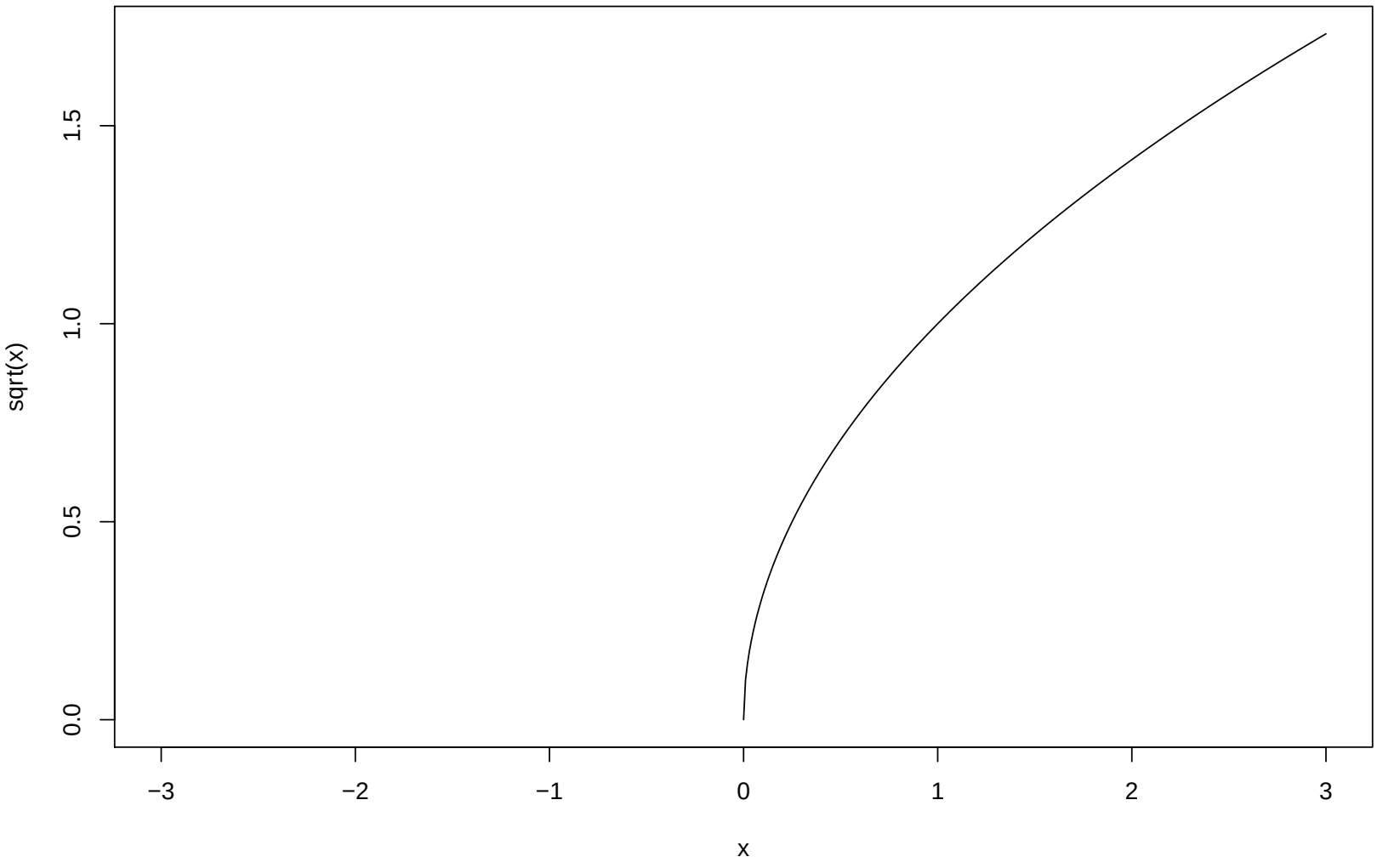
Square function

$$f(x) = x^2$$



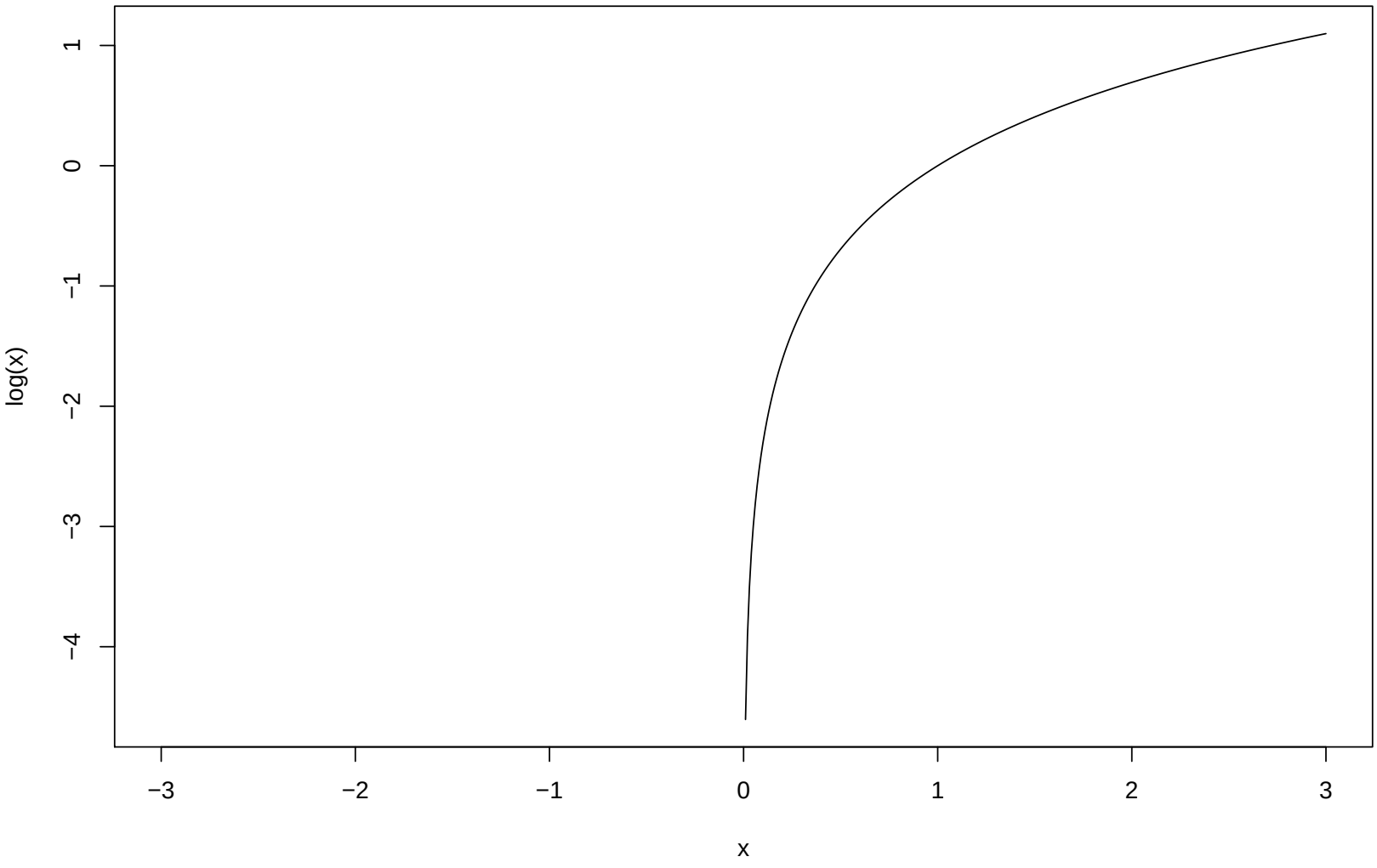
Square root function

$$f_2(x) = \sqrt{(x)}$$



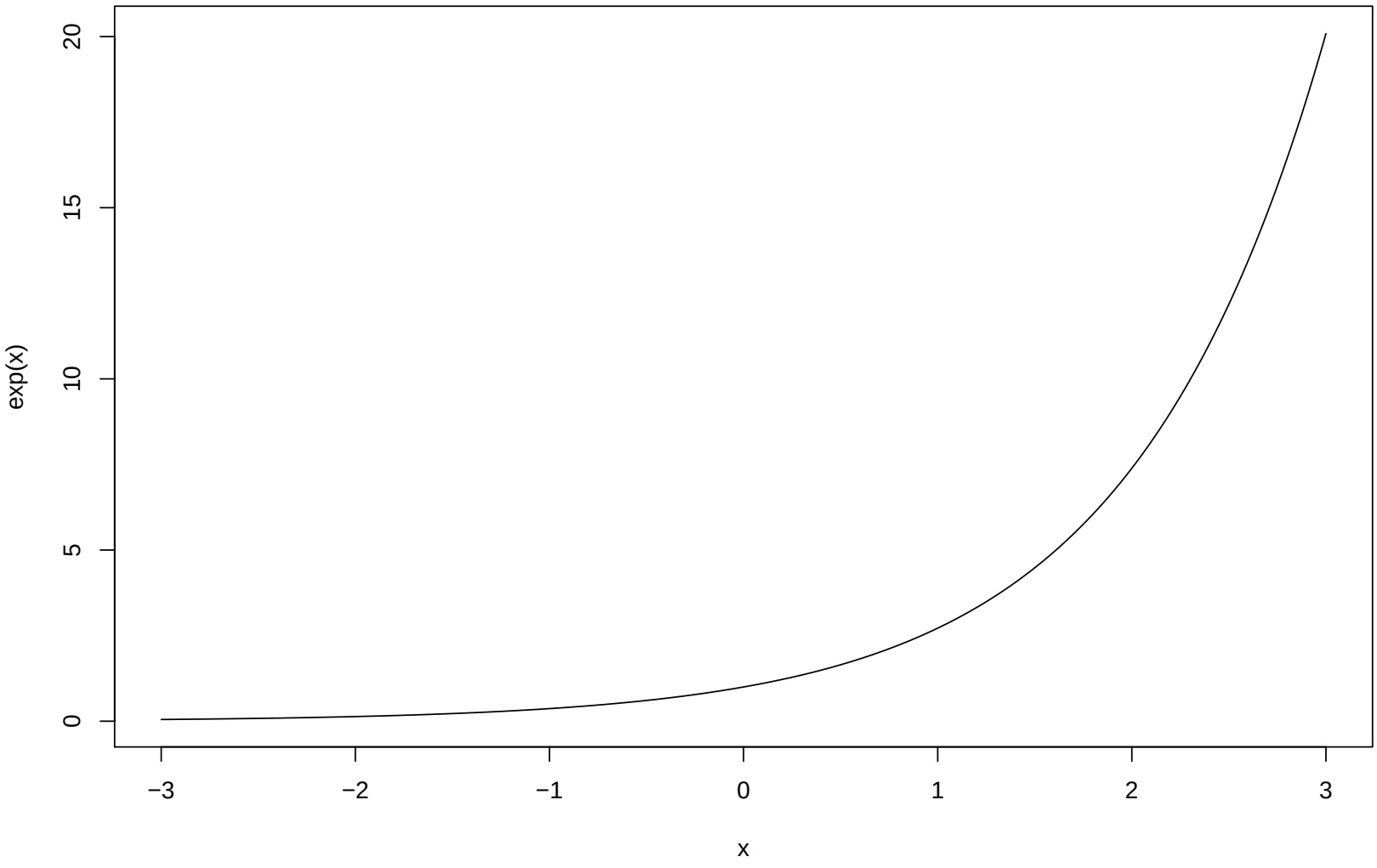
Logarithmic function

$$f_3(x) = log(x)$$



Exponential function

$f_4(x) = exp(x)$



Sine function

$$f_5(x) = sin(x)$$