

# 1 Continuous Functions

**Definition 1.1** A function  $f: \mathbb{R} \rightarrow \mathbb{R}$  is called continuous at  $x \in \mathbb{R}$ , iff for all  $\epsilon > 0$  there is a  $\delta > 0$ , such that  $|f(x) - f(y)| < \epsilon$  for all  $|x - y| < \delta$ . It is called continuous on a set  $S \subseteq \mathbb{R}$ , iff it is continuous at all  $x \in S$ , the set of all such functions is denoted with  $\mathcal{C}^0(S, T)$ , if  $f(S) \subseteq T$ .