

## 1 Differentiable Functions

**Definition 1.1** A function  $f: \mathbb{R} \rightarrow \mathbb{R}$  is called  $\epsilon$ -differentiable at  $x \in \mathbb{R}$ , iff for all  $\epsilon > 0$  there is a  $\delta > 0$ , such that  $\frac{|f(x) - f(y)|}{|x - y|} < \epsilon$  for all  $|x - y| < \delta$ .