Continuous Function

Definition

A function $f : X \to Y$ between topological spaces is said to be **continuous** if for every open set $V \subseteq Y$, the preimage $f^{-1}(V)$ is an open set in X.

Equivalently, a function $f : \mathbb{R} \to \mathbb{R}$ is continuous at a point c if for every $\varepsilon > 0$, there exists a $\delta > 0$ such that

$$|x - c| < \delta \implies |f(x) - f(c)| < \varepsilon \tag{1}$$

for all x in the domain of f.