Recall:

Thm If X is compact, and $f: X \to \mathbb{R}$ is cont. then f is U.C.

$(\forall x \in (0,1),\ f(x) = g(x))$

$\sin(\frac{1}{x})$ ← NOT U.C.

Thm: $f: (a,b) \longrightarrow \mathbb{R}$ is U.C.

$\Leftrightarrow$ f can be extended continuously to $[a,b]$

(Exercise prove this)

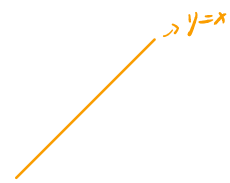
__Thm__

$f : X \to \mathbb{R}$ is cont. at $c \in X$

$\Leftrightarrow$ For any seq. (x_n) in X with $\underline{x_n \to c}$, we have $\underline{f(x_n) \to f(c)}$

$f: [0,1] \to \mathbb{R}$ and $f([0,1]) \subseteq [0,1]$

$\Leftrightarrow$ At some point the graph of $f(x)$ intersects the line $y = x$



$f(0) < 0$ or $f(0) > 0$ $\quad$ $f(1) > 1$ or $f(1) < 1$

(find $c \in [0,1]$ s.t. $h(c) = 0$)