

Theorem 9

$x \in \mathbb{R}, y \in \mathbb{R}$ if $|x-y| < \epsilon$ for all $\epsilon > 0$ then $x=y$
we know: ϵ is a small positive #

so, $\epsilon > 0$ By 21.d

$$|x-y| < \epsilon \quad \text{so,}$$

$$|x-y| = x-y \quad \text{By definition 5.}$$

what is special about $x-y$?

But if $x=y$ then

$$2-2 = 0$$

$$\text{so } |x-y| = 0$$

$$\text{Then } 0 < \epsilon$$

But it says for all $\epsilon > 0$,

what is going on?