Quiz 3 20 min

1) Let $S$ be a non-empty set of real numbers, bounded below. Prove $l$ is a lower bound of $S$ if and only if $l \leq \inf(S)$.

to prove

a) If $l$ is a lower bound of $S$, $l \leq \inf(S)$.

by part 1(a) of the definition of $\inf(S)$,

b lower bound of $S$ $\Rightarrow$ $b \leq \inf(S)$.

since $l$ is a lower bound by hypothesis

$l \leq \inf(S)$.

b) to prove if $l \leq \inf(S)$ $l$ is a lower bound of $S$.

I need to show $a \in S \Rightarrow a \leq l$.

5th $\inf(S)$ is a lower bound of $S$, so

$a \in S \Rightarrow \inf(S) \leq a$.

$L \leq \inf(S)$ hypothesis

$L \leq a$ transitive.