Proof. Suppose $\{x_n\}_{n=1}^{\infty}$ is a bounded sequence of real numbers.

$$\begin{aligned}
\{x_n\}_{n=1}^{\infty} &= \{x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, \ldots\} \\
&= \{x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, \ldots\} \\
&= \{x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, \ldots\} \\
&= \{x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, \ldots\}
\end{aligned}$$

$\blacksquare$