Proof. Let $N \in \mathbb{N}$ such that $\frac{1}{N} < \epsilon$ (By LINK TO ARCHIMEDEAN PROPERTY). Then

$$\begin{aligned} n &> N > \tfrac{1}{\epsilon} \\ \tfrac{1}{n} &< \tfrac{1}{N} < \epsilon \qquad \text{taking reciprocals} \\ |\tfrac{1}{n} - 0| = |\tfrac{1}{n}| &= \tfrac{1}{n} \text{since } \tfrac{1}{n} \text{ is always positive for } n \in \mathbb{N} \\ &< \epsilon \end{aligned}$$

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