1. Show the existence of cube roots for real numbers greater than 1, i.e. if $b \in \mathbb{R}$ and $b > 1$, then there exists a $c \in \mathbb{R}$ with $c^3 = b$.

2. Using the result of the previous problem, show the existence of cube roots for all positive real numbers.

3. Using the results of the previous two problems, show the existence of cube roots for all real numbers.