

Q2. Yes.

It is a direct result of Extreme value theorem.

Theorem

for  $f: A \rightarrow \mathbb{R}$ , if  $f$  is continuous and  $A$  is compact then  $f$  takes on a global minimum in  $A$ , where  $A \subset \mathbb{R}^n$

Reference: week 3 slides: slide 26