

Suppose $\mathbf{f} : E \rightarrow \mathbf{R}^m$ is uniformly continuous on $E \subset \mathbf{R}^n$. Prove that if $\{\mathbf{a}_k\}$ is a Cauchy sequence in E , then $\{\mathbf{f}(\mathbf{a}_k)\}$ is also a Cauchy sequence. Show by means of an example that the conclusion fails in general if \mathbf{f} is merely continuous.