Q.8

Given $\lim_{n\to\infty} a_n = L$ and $M > 0$, Prove $\lim_{n\to\infty} Ma_n = ML$

Proof: $\lim_{n\to\infty} a_n = L$ is the same as $(\forall \varepsilon \in \mathbb{R})(\exists N)(\forall n \geq N)$ $(|a_n - L| \leq \varepsilon)$.

$\lim_{n\to\infty} Ma_n = ML$ is the same as $|Ma_n - ML| \leq M\varepsilon$

By Algebra, $\lim_{n\to\infty} Ma_n = ML$ is the same as $M|a_n - L| \leq M\varepsilon$.

This still conveys that beyond a number n, Ma_n is in some range of L.

Thus, the statement is proven.

QED