
2. Show that every uniformly convergent sequence of bounded functions on a metric space is uniformly bounded.

3. Let $f_n(x) = x(1 + nx^2)^{-1}$ on $\mathbb{R}$. Show that $f_n$ converges uniformly to a function $f$ and consider the convergence of $f'_n(x)$ to $f'(x)$: Is there convergence and what type?

4. Suppose that $f_n$ and $g_n$ converge uniformly on a metric space $X$ and that both are bounded. Then show that $f_ng_n$ converges uniformly on $X$. 