

1. Show $\|f\|_u$ is a vector norm on the vector space of all bounded function on A . That is show for all f, g bounded on A :
 - (a) $\|f\|_u = 0$ iff $f(x) = 0$ for all $x \in A$.
 - (b) For all $a \in \mathbb{R}$ $\|af\|_u = |a|\|f\|_u$.
 - (c) $\|f + g\|_u \leq \|f\|_u + \|g\|_u$.
2. Let $f_n = \frac{nx}{1 + n^2x^2}$. Find f so that f_n converges to f pointwise on \mathbb{R} . Show that for all $a > 0$ the convergence is uniform on $[a, +\infty)$ however the convergence is not uniform on $[0, +\infty)$.