

MATH 554- 703 I - ANALYSIS I
HOMEWORK ASSIGNMENT # 7
DUE TUESDAY - NOV. 6, 2001

1. Use the “sequential test” to carefully prove that the product of continuous functions is continuous.
2. Suppose that $\lim_{x \rightarrow x_0} f(x) = L_1$ and $\lim_{x \rightarrow x_0} g(x) = L_2$, then prove that $\lim_{x \rightarrow x_0} (fg)(x) = L_1 L_2$, if x_0 is a limit point of $\text{dom}(fg) := \text{dom}(f) \cap \text{dom}(g)$.
3. Prove that each finite set is a compact set.
4. Give an example of a closed set which is not compact, and justify your work.
5. Give an example of a bounded set which is not compact, and justify your work.