Answer on Question #69118 – Math – Real Analysis

Question

True/false? Prove.

Every function differentiable on $[a, b]$ is bounded on $[a, b]$.

Solution

Let us start from the fact that if function f is differentiable at x_0 then f is continuous at x_0 (see https://proofwiki.org/wiki/Differentiable_Function_is_Continuous).

Since function f is differentiable on $[a, b]$ (i.e. f is differentiable at any $x_0 \in [a, b]$) then f is continuous at any $x_0 \in [a, b]$, i.e. f is continuous on $[a, b]$.

Since f is continuous on $[a, b]$ then f is bounded on $[a, b]$ (see

http://www-history.mcs.st-and.ac.uk/~john/analysis/Lectures/L21.html).

Answer: True.