Math 142, Extra Reading #2
(to be discussed in class on **2/13/14**)

Evaluate the following (purported) alternative proof of the Mean Value Theorem for Integrals (as stated on page 297 of Stewart): "By the Extreme Value Theorem, there are numbers u and v in $[a, b]$ such that $f(u) = m$ and $f(v) = M$ where m and M are the absolute minimum and maximum values of f on $[a, b]$. By Property 8 of integrals, we have $m(b - a) \leq \int_a^b f(x)\,dx \leq M(b - a)$ so $m \leq \frac{1}{b-a} \int_a^b f(x)\,dx \leq M$, i.e., $f(u) \leq N \leq f(v)$ where $N = \frac{1}{b-a} \int_a^b f(x)\,dx = f_{\text{ave}}$. By the Intermediate Value Theorem, on the interval $[u, v]$ there must exist c such that $f(c) = N$." Do you think this is a correct proof? If there are gaps in the proof, are they fixable, or is the whole approach unworkable?