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4.16

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By 4.15 the range of f is bounded. Thus $s = \sup\{f(x) \mid x \in [a, b]\}$ exists.

Consequently we can find for each positive integer n an element $x_n \in [a, b]$ such that $f(x_n) > s - \frac{1}{n}$.

By BW a subsequence (x_{n_k}) of (x_n) will converge to some x_0 . Check that $x_0 \in [a, b]$.

Since f is continuous at x_0 , $f(x_0) = \lim_{n \rightarrow \infty} f(x_{n_k}) = s$.

Beautiful!

The greater danger for most of us lies not in setting our aim too high and falling short; but in setting our aim too low, and achieving our mark. - Michelangelo Buonarroti



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