(4.4) Optimization

Absolute Extrema of a function f

If $f(x) \leq f(c)$ (resp. $f(x) \geq f(c)$) for all x in the domain of f, then $f(c)$ is called the absolute maximum value of f. (resp. absolute minimum value).

Theorem (Extreme Value Theorem)

If a function f is continuous on a closed interval $[a,b]$, then f has both an absolute maximum value and an absolute minimum value on $[a,b]$.

Closed Interval Method: This gives us the algo for finding absolute max/min on a closed, bounded interval $[a,b]$. They always exists by the theorem above.

1. Find critical numbers that lie in open interval (a,b). (Next, we will treat these as well as a & b as crit. pts.)
2. Compute f at each critical number; compute $f(a)$, $f(b)$.
3. The largest out of these is absolute max.
   The least " " " is absolute min.