

4.1: max & mins

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ex1: Sketch max & mins of:

(a) $f(x) = \dots$

(b) $g(x) = \sin x, 0 < x \leq \frac{\pi}{2}$

(c) $h(x) = \sin x, -\frac{\pi}{2} \leq x \leq \frac{\pi}{2}$

Abs. vs. local max

EIV: If f is cont. on $[a, b]$, then f attains
abs max $f(c)$ & abs min $f(d)$ at some numbers
 c & d in $[a, b]$

Q: where is the derivative in all of this?

Fermat's Thm: If f has a local max or
min @ c , and if $f'(c)$ exists, then $f'(c) = 0$.

Caution: HPI & cusps

Def: A critical number of a fcn f is a
number c in the domain of f s.t. either
 $f'(c) = 0$ or $f'(c)$ DNE.

ex1: Find the abs. extrema
on the given interval.

ex2: Find the critical numbers

(a) $f(x) = 2x^3 + x^2 + 2x$

(a) $f(x) = x^3 - 6x^2 + 5$ on $[-3, 5]$

(b) $g(x) = x^{1/3} - x^{-2/3}$

(b) $g(x) = x e^{-x/8}$ on $[-1, 4]$