

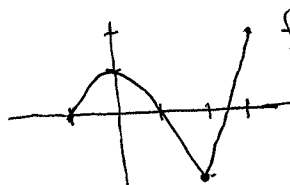
You must show all your work to receive credit. Calculators are allowed.

Problem 1: (6 points) Let $f : [-1, 3] \rightarrow \mathbb{R}$ be the function defined by

$$f(x) = \begin{cases} 1 - x^2 & -1 \leq x < 2, \\ 5x - 13 & 2 \leq x \leq 3. \end{cases}$$

Find the critical numbers, the local max and min values, and the absolute max and min values. (Remember that values refers to the outputs of f and numbers refers to the inputs of f .)

$$f'(x) = \begin{cases} -2x & -1 \leq x < 2 \\ \text{DNE} & x = 2 \\ 5 & 2 < x \leq 3 \end{cases}$$



crit. #s: $x = 0, x = 2$

local max at 0 is $f(0) = 1$

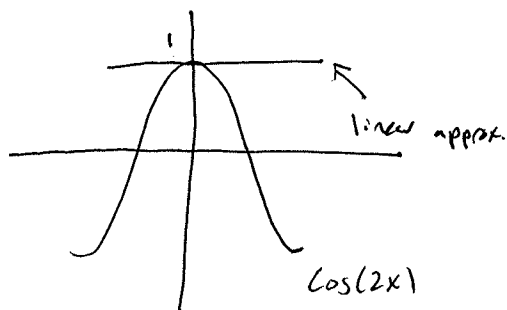
local min at 2 is $f(2) = -3$

$f(-1) = 0, f(3) = 2$

abs. max at 3 is $f(3) = 2$

abs. min at 2 is $f(2) = -3$

Problem 2: (4 points) Let $g(x) = \cos(2x)$. Use the linear approximation of g at 0 to approximate $g(.2)$.



$$g'(x) = -2 \sin(2x)$$

$$g'(0) = 0$$

$$g(.2) \approx 1$$