Math 1A: Discussion 10/19/2018

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1 Part 1: Concept Check

- The derivative $f'(x)$ of a function tells us...

- If $f'(a) > 0$, the function f is _____ at $x = a$.

- If $f'(a) < 0$, the function f is _____ at $x = a$.

- If $f'(a) = 0$ or if $f'(a)$ is undefined, the point $x = a$ is called a _____.

- What is the difference between a local maximum versus a global maximum?

- Sketch the graph of $f(x) = x^4 - x^2$. Use this graph to explain the difference between a local maximum and a global maximum.

- If a function f has a local maximum or minimum at $x = a$, then $x = a$ is a critical point. (True/False)

- If $x = a$ is a critical point, then f has a local maximum or minimum at $x = a$. (True/False)

- With respect to the last two bullet points, discuss the examples of $f(x) = |x|$, $f(x) = x^2$ and $f(x) = x^3$.

- How can you tell if a critical point $x = a$ for a function f is a maximum of f, a minimum of f, or neither?

2 Examples: Curve sketching for three functions

Sketch the graphs of $f(x) = x^3 - x$, $g(x) = x\ln(x)$, and $h(x) = x^3 + 3x^2 + 3x$, using the location of the zeros, using the location of the maxima/minima, and using information about where the function is increasing or decreasing to help you.