Assignment 7 - Maxima, Minima

MTH101, Fall 2017. IISER Pune.

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1. Find the maximum and minimum values of the function $f : [-1, 1] \to \mathbb{R}$ where

$$f(x) = x^5 + x + 1$$

2. Find the minimum value of $f(x) = |x| + \frac{1}{1+|x|}$ on $[-10, 10]$. What can be said about the minimum value of this function on whole of $\mathbb{R}$?

3. Define the notion of local minimum and local maximum point of a function. Give an example to show that a local mininimum point may not be a minimum point.

4. State and prove Rolle's theorem. Assume that every continuous function on a closed interval has a maximum and minimum point.

5. Let $f : (a, b) \to \mathbb{R}$ be a differentiable function and $x \in (a, b)$ be a local maximum point. Show that $f'(x) = 0$.