

## ASSIGNMENT 9

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*There are two parts to this assignment. The first part is on WeBWorK — the link is available on the course webpage. The second part consists of the questions on this page. You are expected to provide full solutions with complete justifications. You will be graded on the mathematical, logical and grammatical coherence and elegance of your solutions. Your solutions must be typed, with your name and student number at the top of the first page. If your solutions are on multiple pages, the pages must be stapled together.*

*Your written assignment must be handed in **before your recitation on Friday, November 20**. The online assignment will close at **9:00 a.m. on Friday, November 20**.*

1. Find all the local extrema of  $f(x) = 2x + \frac{2}{x}$ .
2. This question gives an example of a function illustrating the fact that the sign of a derivative *on an interval*, not a point, indicates whether the function is increasing or decreasing.

$$\text{Let } f(x) = \begin{cases} x + 2x^2 \cos\left(\frac{1}{x}\right) & \text{if } x \neq 0 \\ 0 & \text{if } x = 0 \end{cases}.$$

- (a) Prove that  $f'(0) = 1$ .
  - (b) Prove that  $f(x)$  is not increasing on any interval  $(-\delta, \delta)$  where  $\delta > 0$ .
3. On your UBC Blog, post a question, on any topic covered in this course, which is suitable for the final exam. Then post a solution to your question.

You will be graded on the appropriateness of your question and the correctness of your solution. You are encouraged to share your question on Piazza as a study resource for your classmates. Particularly good questions may be used on the actual exam.

On your assignment submission, please include the URL of your blog.