Math 141 HW4

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Due: Monday February 4, 2019 at 3:35 PM

Instructions: Answer all questions. Show all work and justify all your answers in **complete sentences**, where applicable. **All work you turn in must be in your own words and reflect your understanding of the material. Copying solutions is strictly prohibited.** Please **staple your work** if you use multiple pages.

Problem 1) Evaluate the following limit using the Squeeze Theorem.

$$\lim_{x\to 1}(x-1)^2\cos\left(\frac{1}{x-1}\right)$$

Problem 2) Evaluate $\lim_{x\to 0}\frac{x}{|x|}$. If the limit does not exist, clearly justify your work in **complete sentences.**

Problem 3) Provide a specific example of a function $f(x)$ that is defined for all real values of x **except** $x=0$, and $\lim_{x\to 0} f(x)$ does not exist. You can provide an explicit formula or graph.

Problem 4) Suppose that $f(x)$ is a function satisfying $\lim_{x\to 1} f(x) = 5$. Is it true that $f(1)=5$? If so, clearly justify why this is the case. If not, provide a specific function $f(x)$ where $\lim_{x\to 1} f(x) = 5$ but $f(1)\neq 5$. You may provide a specific formula or a graph.