ASSIGNMENT 1

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, September 18****. The online assignment will close at* ***9:00 a.m. on Friday, September 18****.*

1. Evaluate the limit $\lim\limits_{x\to 1} \dfrac{x^3 - x}{x^2 - 1}$, and justify your answer using the definition of limit.

2. Let $f(x) = \begin{cases} x^2 & \text{if } x \text{ has a decimal expansion containing the digit "1"} \\ 0 & \text{otherwise} \end{cases}$.

   (a) Prove using the definition of limit that $\lim\limits_{x\to 0} f(x) = 0$.

   (b) Prove using the definition of limit that $\lim\limits_{x\to 1} f(x)$ does not exist.

3. Periodically, you will be asked to post mathematical reflections on a blog. These reflections train your ability to explain abstract mathematical ideas, a key skill in higher-level mathematics.

   Instead of completing a third written question on this assignment, we want you to set up your blog using the UBC Blogs service and post a test message on it. You must do so before Friday, September 18 to receive full marks. There is a link to the UBC Blogs page on the course webpage.

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