

Instructions:

- Due Friday 12/4/2020 by 5pm.
 - Turn in your quiz as a digital pdf file on Blackboard. Name the digital file precisely as follows: "quiz03_math413_lastname.pdf" with "lastname" replaced by your surname (i.e. family name, last name).
 - You may use your course notes, my notes, and our course textbook as references.
 - No collaboration allowed.
 - No computational devices allowed.
 - You must clearly justify all steps in your work. If you state an inequality or bound, be sure to justify it.
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1. (20 pts) Prove that the following function is continuous at $x = 0$. Directly use the definition of continuity.

$$f(x) = \begin{cases} 2x & \text{for } x \in \mathbb{R} \setminus \mathbb{Q} \\ 0 & \text{for } x \in \mathbb{Q} \end{cases}$$

2. (30 pts) Prove that $f(x) = \frac{1}{x^2}$ is uniformly continuous on $[2, 5]$. Directly use the definition of uniform continuity.