

# Math 203-LL. Extra Credit #1

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Due: Thursday, October 30th

Each of the following problems is worth 5 bonus points on Quiz 2.

## Problem 1

Give an example of a function of one variable  $f(x)$  such that for some real number  $a \in \mathbb{R}$

- (a)  $f$  is continuous at  $a$ ,
- (b)  $f$  is differentiable at  $a$ , but
- (c)  $f'$  is not continuous at  $a$ .

To show parts (a), (b), and (c) you must use the definitions of *continuous* and *differentiable* which use limits.

## Problem 2

Give an example of a function of two variable  $f(x, y)$  such that for some point  $(a, b) \in \mathbb{R}^2$

- (a)  $f$  is continuous at  $(a, b)$ ,
- (b)  $f_x(a, b)$  and  $f_y(a, b)$  exist, but
- (c)  $f_x$  and  $f_y$  are not both continuous at  $(a, b)$ .

To show parts (a), (b), and (c) you must use the definitions of *continuous* and *differentiable* which use limits.