Homework assignment, March 2, 2007.

1. Prove that the function $x \mapsto |x|$ is continuous for all x in \mathbb{R} .

2. Give examples of the situation where

$$\lim_{x \to x_0} f(g(x)) \neq f(\lim_{x \to x_0} g(x)).$$

Try to get all possible situations of what can go wrong: the limit in the right side exists, but is different from the left side, or the limit simply does not exists.