Math 330 Section 3 Homework 18

Due date: Fri, December 4, 2015   *Running total:* 54 *points*
Last submission Mon, December 14, 2015(!!)

Status - Reading Assignments:

Here is the status of the reading assignments you were asked to complete by this date.

Textbook:
    all of ch.1 - ch.6, ch.7.1,
    all of ch.8 - ch.13

Other course material (course materials page):
    "Logic part 1", "Sets part 1", "Sets part 2", "Functions part 1", "Functions part 2"

"Lecture Notes: Math 330 - Additional Material":
    All of ch.3 (understand the material)
    all of ch.4 (understand the proofs!)
    all of ch.5 (learn all definitions and the two theorems at the end, skip the proofs
    All of ch.6 (understand the material) EXCEPT ch. 6.2.2 on normed vector spaces
    all of ch.7 with the following **exception**:
      ch.7.1.4: skip the end of ch.7.1.4, starting at def. 7.12
      ch.7.4 (addenda): skip subchapter 7.4.4 (Hahn-Banach

New reading assignments:

Reading assignment 1: due Mon, 11/30/2015

"Lecture Notes: Math 330 - Additional Material":
    Re-read Ch.7.4: Addenda to ch.7 as I made some additions to ch.7.4.3 concerning metric subspaces.
    Ch.8.1-8.3: Skip the proofs of 8.3 but be sure to learn the definitions and theorems!

Assignment 1:

Prove the following: Let $A \subseteq \mathbb{R}$ and let $f(\cdot) : A \to \mathbb{R}$. Let $B := \{f \neq 0\} \cap A = \{x \in A : f(x) \neq 0\}$. Assume that f is continuous at $b \in B$. Prove that the function $g(\cdot) : B \to \mathbb{R}$ defined as $g(x) := 1/f(x)$ is continuous at b.

Hint: Use B/G **(not MF)** Proposition 10.23 (rules to compute limits of sums, products, ...) together with the def. of sequence continuity (don't use the $\varepsilon - \delta$ characterization of continuity).