MAT 200: HOMEWORK 5
DUE WED, MARCH 9, 2016

1. Consider the following arguments:
  (a) No homework is fun.
     Some reading is homework.
     Therefore, some reading is not fun.
  (b) All informative things are useful.
     Some websites are not useful.
     Some websites are not informative.
  For each of them, (1) write it in symbolic form, using quantifiers. Write the notation you are using (e.g., $F(x)$ for "x is fun", $H(x)$ for "x is homework", etc) and (2) prove it, using the methods of proof discussed in class.
  FYI: these are examples of two of Aristotle's syllogisms, namely *Ferio* and *Baroco*. For more information, google Aristotle and syllogism.

2. A subset $A \subset \mathbb{R}$ is called bounded if there exists a real number M such that $|x| \leq M$ for all $x \in A$.
  (a) Rewrite this definition using only quantifiers, logic connectives, arithmetic operations, and inequalities.
  (b) Write a definition of unbounded set without using the word "not" (or symbol $\nexists$).
  (c) Show that the set of negative real numbers is unbounded.

3. Prove that if functions $f \colon A \to B$, $g \colon B \to C$ have inverses, then the composition $g \circ f$ also has an inverse, and $(g \circ f)^{-1} = f^{-1} \circ g^{-1}$.

4. Textbook, p. 117, problem 14

5. Textbook, p. 117, problem 15