Math 112-40, Mr. Church, Homework 4
Due at the beginning of class on Friday, October 23.
Please staple your homework.

1. Exercise 2.10b.

2. Exercise 2.12a.

3. (a) Which positive real numbers have $\sqrt{x} < x$?
   Which positive real numbers have $x < \sqrt{x}$?

   (b) Try to prove your answer to a) is correct, using the four order axioms[1] and the theorems from class.

In the next question we'll show that it is not possible to put an order on the ring $\{E, O\}$ of Even-Odd Arithmetic.

4. If we have an order $<$ on the ring $\{E, O\}$ which satisfies the four order axioms, then by the Trichotomy axiom we must have either $E < O$ or $E > O$. Show (using the four order axioms) that $E < O$ leads to a contradiction with one of the axioms. Now Show that $E > O$ also leads to a contradiction. We conclude that there is no order on the ring given by Even-Odd Arithmetic.

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[1]Trichotomy, Transitivity, Addition for Inequalities, and Multiplication for Inequalities