Math 136, Homework 9, due Thurs. April 9

We will finish chapter 11 this week, then move on to Chapter 8. I would also like you to read section 9.1. This is material we've already covered in class, but I am assigning a few problems on it.

Once we get to Chapter 8, the lecture notes that are posted at Bcourses will play a big role in supplementing the text. Please pay attention to them.

There is a second midterm coming up. The way it will work is, I will post the midterm at Bcourses. After a certain amount of time, you will need to submit your solutions on gradescope, just as you would a homework. It will be "open book". April 16 is a likely date.

Exercises due April 9:
From chapter 11: 1.10 (page 206) problems 2–8.
From section 9.1: 1.7 (page 160) problems 1, 3, 4, 5.
Bonus problem 4 and 5: (As with all bonus problems, you can get extra credit for solving them. It's no longer possible to present the solution in my office, so just write up your solution carefully and email it to me.) Let $A \leq_1 B$ iff there is a total, recursive, *one-one* function f such that for all n, $n \in A \Leftrightarrow f(n) \in B$. Show:

(a) If B is creative and A is r.e., then $A \leq_1 B$. (Hint: Re-do the proof of Myhill's theorem, being careful to get one-one functions. You may use exercise 8 on p. 206, for example.)

(b) If $A \leq_1 B$ and $B \leq_1 A$, then there is a recursive total bijection $f\colon N \to N$ such that for all n, $n \in A \Leftrightarrow f(n) \in B$.

(c) If A and B are complete r.e., then there is a recursive total bijection $f\colon N \to N$ such that for all n, $n \in A \Leftrightarrow f(n) \in B$.

The solutions to (a) and (b) do not depend on each other, so I will give independent credit for each. Part (c) is an easy consequence of (a),(b), and the fact that complete r.e. sets are creative.