Winter 2012
Kronenthal

Math 210 Section 011
Homework 5 (corrected)

Due Date: Friday, January 20 by 11:00 am

A few reminders:

- Before attempting these graded problems, be sure to try the ungraded questions; they might help you with these problems.
- Your homework must be written neatly, explained completely, and stapled if you turn in more than one piece of paper. Problems must be presented in order. Work not satisfying these criteria will be penalized.
- You are welcome to discuss the mathematics behind the homework with others, but you must write the answer to each problem by yourself.

1. Suppose $g : A \to B$ and $h : B \to C$ are functions for some sets A and B. Decide whether each of the following statements is true or false. Provide a proof or counterexample, as appropriate.
   (a) If $h \circ g$ is onto and h is onto, then g must be onto.
   (b) If $h \circ g$ is one-to-one and g is onto, then h must be one-to-one.
2. Prove that there does not exist any complete square n^2 (where n is an integer) in the form $5k + 2$ or $5k + 3$ for some integer k.
3. Prove that the equation
   $$4851x + 630y = 21$$
   has no solutions such that x and y are both integers.
   (Hint: Start by computing $\gcd(4851, 630)$.)