Math 215: Introduction to Advanced Mathematics
Last Problem Set

Due Tuesday May 1

Recall that $n$ is divisible by $d$ if there is a $q$ with $qd = n$.
1. page 225 number 2, page 271: 1,3
2. Assume the division algorithm for the natural numbers. If $a, b$ are integers with $a \geq 0$ and $b > 0$ there are unique (positive) integers $q, r$ with $0 \leq r < b$ such that:

   $$ a = qb + r. $$

   Complete the proof for negative $a$. What are $q$ and $r$ if $a = -123$ and $b = 7$?
3. Recall the two definitions I gave on April 24.
   $(N, <, +)$ satisfies IND if for every $A \subset X$: If $1 \in A$ and $k \in A$ implies $k + 1 \in A$ then $A = N$.
   $(N, <, +)$ satisfies WO if every nonempty $A \subset X$ has a least element.
   I proved in class that WO implies IND. Show IND implies WO. (Note of course that both of these are actually true of the natural numbers.)