MATH 215 (WHYTE), MIDTERM EXAM NOV 2nd 2018

State clearly the definitions and axioms used. You may not use any of the propositions from class or the worksheets unless you also include their proofs.

(1) Prove that if a, b, and c are integers and n a natural number such that $a \equiv b \bmod n$ and $b \equiv c \bmod n$ then $a \equiv c \bmod n$.

(2) Prove that if x and y are integers where $x|y$ and $y|x$ then $x = y$ or $x = -y$.

(3) Prove that if m and n are natural numbers with $n < m$ then $n^k < m^k$ for all $k \in \mathbb{N}$.

(4) Show that common divisors of s and t are the same as the common divisors of s and $s - t$.