CMSC 250 Homework 6 Fall 2005

0201 & 0202

Due Wed Oct 12 at the beginning of your discussion section.

Note: This material will be covered on the exam on Oct 11.

You must write the solutions to the problems single-sided on your own lined paper, with all sheets stapled together, and with all answers written in sequential order or you will lose points.

For each of the following statements, prove that the statement is true, or give a counterexample to show that it is false.

1. For any integers p and q, if $p|q$ and $q|p$, then $p = q$.
2. $\forall p \in \mathbf{Z}^{prime}$, $\sqrt[3]{p}$ is irrational.
3. $\forall n \in \mathbf{Z}^{\geq 2}$, $\sqrt[n]{7}$ is irrational.
4. For any integer n, $n^3 \equiv_9 0$ or $n^3 \equiv_9 1$ or $n^3 \equiv_9 8$.
5. Let $a, b, c \in \mathbf{Z}$ such that $a^3 = b^4 = c$, and let p be a prime number. If $p|a$, then $p^3|b$.