DISCRETE MATHEMATICS
Math 245
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Assignments for Ch 4

Due Thursday 03/15/2012

1. This is Epp 2nd Ed. 3.6 #14, 3rd Ed. 3.6 #26. Consider the statement,

   For all integers a, b, c, if $a|b$ and $a \not| c$ then $a \not|(b+c)$.

   (a) Choose integers a, b, c illustrating the statement's claim.
   (b) Prove the statement using two applications of the logical equivalence $p \to (q \vee r) \equiv (p \wedge \sim q) \to r$ and a previous result that we have seen.
   (c) Prove by contradiction. Suppose a, b, c satisfy the premises and the negation of the conclusion. Derive a contradiction.

2. We know that the product of two rational numbers is rational. Prove by contradiction that the product of a nonzero rational and an irrational is irrational.

3. Mimic the proof that $\sqrt{2}$ is irrational to prove that $\sqrt{3}$ is irrational.

4. Prove the following result using the definition of floor (See Epp 2nd Ed. and 3rd Ed 3.5 #23-24, do not use #23 to prove this problem.) Let x be a real number and let m be an integer. If x is not an integer then $\lfloor x \rfloor + \lfloor m - x \rfloor = m - 1$.