Math 312, Section 102 Homework #4

due Tuesday, October 9, 2001 at the beginning of class

- I. Hint for these two problems: think in terms of the prime power factorizations of a and b.
 - (a) Rosen, Section 3.4, p. 104, #8
 - (b) Rosen, Section 3.4, p. 106, #38
- II. (a) Find the smallest positive integer with exactly 21 positive divisors.
 - (b) Find all positive multiples of 210 that have exactly 24 positive divisors.
- III. (a) By definition, any common multiple of a and b is greater than or equal to [a, b]. Show that any common multiple of a and b must in fact be a multiple of [a, b]. In other words, show that if $a \mid m$ and $b \mid m$, then $[a, b] \mid m$.
 - (b) Give an example to show that it is possible for $a \mid m$ and $b \mid m$ but $ab \nmid m$.

IV. Rosen, Section 3.6, p. 123, #2(b)-(c) and #6

V. Rosen, Section 3.6, p. 124, #14 and #16