Math 567, Assignment #6

(due March 9)

This assignment covers material up through section 7.3.

1. Is the sum of two multiplicative functions multiplicative? What about their product?

2. Show that the following functions of n are multiplicative, and then use multiplicativity to calculate their values at $n = 720$: (a) the sum of the square divisors of n (actually, you showed that this is multiplicative in the last problem set, so for part (a) all you need to do is calculate the sum when $n = 720$); (b) the sum of the squares of the divisors of n; (c) the sum of the square-free divisors of n.

3. Find a formula for $F(n) = \sum_{d|n} \mu^2(d)/\tau(d)$ in terms of the prime factorization of n.

4. Use Mobius inversion to count the rotationally distinct 4-bead necklaces, when each bead can be any of 3 colors.