

Math 4410 Discussion questions, Nov. 15, 2019

- (1) Define the Möbius function without using factorization of n into a product of primes.
- (2) (a) $F(n, j)$ be the number of ordered pairs of subsets (A_1, A_2) of $[n]$ such that $|A_1 \cap A_2| = j$.
(b) Using your formula for $F(n, j)$, compute

$$\sum_{j=0}^n F(n, j).$$

- (c) What is a one or two line proof of your result of the previous problem?
- (3) Explain what the text means when it says that for $m \leq n$,

$$\sum_{k=m}^n S(n, k)s(k, m) = \delta_{mn}$$

is "... just the standard relation between the matrices for basis transformation."