

**Fall 2022, Math 522: Preliminary Problem Set 8**  
**Due: Wednesday, October 19th, 2022**  
**The Möbius Function**

**Preliminary problems.** These problems should be completed before discussion.

(P1) Recall from lecture that

$$\mu(n) = \begin{cases} (-1)^k & \text{if } n = p_1 p_2 \cdots p_k \text{ for } p_1, \dots, p_k \text{ distinct primes;} \\ 0 & \text{otherwise.} \end{cases}$$

Use this to verify  $\mu(nm) = \mu(n)\mu(m)$  whenever  $\gcd(n, m) = 1$ .

Hint: there should be 4 cases, based on whether  $n$  and/or  $m$  have repeated prime factors.

(P2) Draw the Hasse diagram for the divisibility poset  $D_{36}$ .