

$$M = \prod p_i^{\alpha_i}$$

$$N = \prod p_i^{\beta_i}$$

(use
 $p_1=2, p_2=3$
 $p_3=5, p_4=7$ etc)

$$\gcd(M, N) = \prod p_i^{\min(\alpha_i, \beta_i)}$$

$$\text{LCM}(M, N) = \prod p_i^{\max(\alpha_i, \beta_i)}$$

use this to prove

$$\text{LCM} = \frac{MN}{\gcd}$$

Modular Arithmetic