

MA 614 – Homework 26
Due Friday, April 8

Your answers should be detailed explanations in quality mathematical English. You must type your homework in LaTeX.

1. Find a simple formula for the number of maximal chains in the partition lattice Π_n .
2. (a) Prove that $B_n \cong (C_1)^n$.
(b) Prove that if $n = p_1^{m_1} p_2^{m_2} \cdots p_j^{m_j}$ for distinct primes p_i and positive integers m_i , then $D_n \cong C_{m_1} \times C_{m_2} \times \cdots \times C_{m_j}$.
3. Prove that the rank generating function $F(P, q)$ for the power poset $C_n^{C_m}$ is the q -binomial coefficient $\begin{bmatrix} m+n+1 \\ n \end{bmatrix}_q$.
4. (a) Let P be a finite poset and $f : P \rightarrow P$ an order-preserving bijection. Show that f is an isomorphism.
(b) Show that this can fail when P is an infinite poset.