Math 184A, Fall 2018
Homework 8
Due: Friday, December 7 by 3:30PM in basement of AP&M

(1) For the following, write $\exp(x)$ instead of e^x for ease of reading the superscript.
$F(x) = \sum_{n \geq 0} f_n x^n$ is a formal power series that satisfies the following identity:
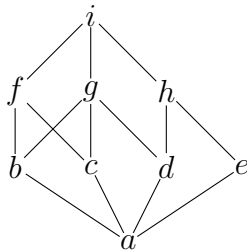$$F(x) = \exp\left(\frac{x}{2}(F(x) + 1)\right).$$
Find a formula for f_n.

(2) Draw the Hasse diagram of the following posets:
 (a) Set partitions of $[4]$.
 (b) Divisors of 120.

(3) Compute the Möbius function for all pairs of elements $\mu(x, y)$ (you don't need to list out the cases when $x = y$) of the following poset whose Hasse diagram is drawn below:

(4) How many necklaces are there of length n using k different colors for the beads where n is:
 (a) 8
 (b) 12
 (c) 30

Hints:

1: Consider $A(x) = x(F(x) + 1)$