Homework 1
Combinatorics, Dave Bayer, due January 28, 2014

Name: _____________________________ Uni: ________________

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If you need more than one page for a problem, clearly indicate on each page where to look next for your work.

[1] Without using matrix multiplication, count the number of paths of length ten from \( w \) to itself.
[2] Let $x$ and $y$ have degree 1, and let $z$ have degree 3. Count the number of monomials in $x$, $y$, and $z$ of degree 12.
Six people are seated around a round table.
(a) How many ways can they be reseated, so everyone moves to a new chair?
(b) How many ways can they be reseated, so everyone has new neighbors on both sides?
There are five ways to fully parenthesize the product $abcd$:

$$a(b(c)d), \quad a((bc)d), \quad (ab)(cd), \quad (a(bc))d, \quad ((ab)c)d$$

How many ways are there to fully parenthesize the product $abcdef$?