

Disco II  
Worksheet #3  
Professor Broughton

Name: \_\_\_\_\_

Box #: \_\_\_\_\_

### 1. Rook polynomials

Let  $R_{m,n}$  be the rook polynomial of the rectangle of  $m$  rows and  $n$  columns.

1. Compute all rook polynomials  $R_{m,n}$  where  $m, n \leq 5$ . Follow the calculations in the script `genpolys.mws`, constructing the appropriate pictures to help understand the derivation.
2. Do you notice any patterns in the polynomials?

## 2. Generating Functions

Read the material in section 9.1.

3. Example 9.3 page 389. Calculate the number by generating functions and also directly using inclusion and exclusion.

4. Solve problem 1 page 389 by generating functions and inclusion/exclusion.

5. In how many ways can you make change for 5 dollars with nickels, dimes, and quarters. Calculate this any way you can.