

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

# Math 378 Spring 2011

## Assignment 4

To Hand In:

Brualdi Ch. 6: 2, 3, 7, 9, 10, 12, 14, 15, 16, 21, 29

### Extra Problems

1. A carousel has eight seats, each representing a different animal. Eight girls are seated on the carousel facing forward (each girl looks at another girl's back).

(a) In how many ways can the girls change seats so that each has a different girl in front of her?

(b) How does this problem change if all the seats are identical?

(c) Now arrange the girls in a line facing the girl in front of them. In how many ways can the girls rearrange themselves (in a line) so that each has a different girl in front of her?

(d) As in part (c), but now with  $n$  girls.

2. Count the number of ways to place  $n$  non-attacking rooks on the  $n \times n$  boards below with forbidden positions as shown.

(a)

×	×				
		×	×		
				×	×

(b)

×							
	×						
		×					
			×				
				×			
					×		
						×	
							×

(c) What is the probability of (b)?

3. Two distinguishable circles and a triangle are given in the plane. What is the largest number of points that can belong to at least two of the three figures?