

Spring 2003 Math 510 Exam II

Time: 12:30pm–1:20pm, Tuesday, April 12, 2003

Name: _____

Please read the problems carefully and do **all** you are asked to do. You need to show your work to indicate how you do each problem. Your proofs and explanation should be literally clear.

Total/100	#1/15	#2/15	#3/15	#4/15	#5/20	#6/20

1. (15pts) The Wonka candy store has four types of Wonka bars, apple, banana, chocolate, and vanilla flavors, with only 5 bars remain for each type. The owner is to pack a box of 12 Wonka bars randomly. How many different arrangements will be possible for the box?

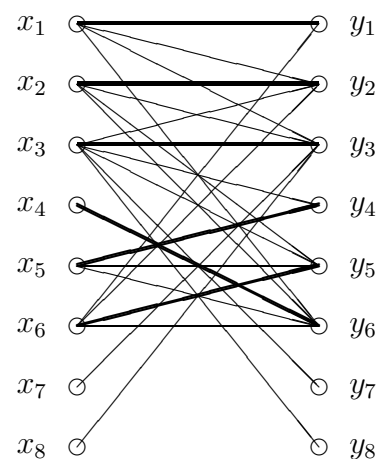
2. (15pts) Determine the number of ways to place 6 non-attacking rooks on this board with forbidden positions as shown.

X	X				
X	X				
				X	X
				X	X

3. (15pts) Find the number of integers from 1 to 100,000 that are not multiples of 4, 6, or 12.

4. (15pts). 40 couples at a party go to dancing floor to dance. In how many ways can these couples dance such that exactly 29 men each dancing with someone else's wife.

5. (a) (10pts) For bipartite graph and the given matching M , find an M -alternating chain and then change the matching M to a matching with 7 edges



(b) (10pts) With matching M' you obtained in (a), prove that is a max matching by finding a cover S with 7 vertices.

6. (20pts) For the recurrence relation $h_n = 5h_{n-1} - 6h_{n-2}$,

(a) Find the general solution.

(b) Compute the generating function $g(x)$ for the sequence h_0, h_1, h_3 , if $h_0 = 2$, and $h_1 = 3$.