

Math 475 HW # 4, 5, 6

due M, 2/1

4) Permutations of  $\{1, 2, 3, 4, 5, 6, 7, 8\}$  s.t. 1 next to 2, 3 next to 4, 5 next to 6, & 7 next to 8?  
 OR really just  $\{\overline{12}, \overline{34}, \overline{56}, \overline{78}\}$

4! orderings of pairs, 2 orderings within each pair (4 of them)

$$4! \cdot 2 \cdot 2 \cdot 2 \cdot 2 = 4! \cdot 2^4$$

$$\therefore \# \text{ permutations} = \underline{384}$$

5) How many ways can 4 women & 4 men sit at a circular table s.t. no two women are next to each other?

Fix a woman at the "top" of the table

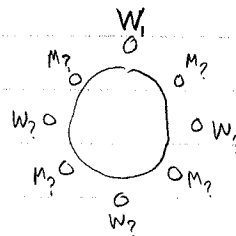
(don't need to worry about rotations)

4! possible placements for men

3! possible placements for women

$$4! \cdot 3!$$

$$\therefore \underline{144 \text{ ways}}$$



6) How many 5 card poker hands contain 2 pair?  
 — choose 2 suits — ways for pair — ways for pair — last card can't be same value as others in deck

$$\binom{13}{2} \binom{4}{2} \binom{4}{2} \binom{11}{1} \binom{4}{1}$$

$$\frac{13 \cdot 12}{2} \left( \frac{4 \cdot 3}{2} \right)^2 \left( \frac{11}{1} \right) \left( \frac{4}{1} \right)$$

$$\underline{\underline{123,552 \text{ 2-pair hands}}}$$