6/6

Homework Set #6

15.8

Due: October 12

Twelve people join hands for a circle dance. Suppose six of these people are men, and the other six are women. In how many ways can they join hands for a circle dance, assuming they alternate in gender around the circle.

Bor 6 (6-1) (6-1) (6-2) (6-2) (6-3) (6-3) (6-4) (6-4) (6-5) (6-5)

$12 \times 6 \times 5 \times 5 \times 4 \times 4 \times 3 \times 3 \times 2 \times 2 \times 1 \times 1$

B G B G B G B G B B G B

1 2 3 4 5 6 7 8 9 10 11 12

$2(\text{Bor } 6) \times (6!)^2$ total arrangements

Equivalence class size:

$2 \times 6 = 12$

Therefore the answer is

$$\frac{2(6!)^2}{12} = 6!5! \text{ Ways they can join hands}$$

Homework Set #6

16.28 b) and e)

Due: October 12

A poker hand consists of 5 cards chosen from a standard deck of 52 cards. There are a variety of special hands that can be dealt in poker. For each of the following types of hands, count the number of hands that have that type.

(b) Three of a kind: The hand contains three cards of the same numerical value and two other cards with two other numerical values.

$$13 \times \binom{4}{3} \times \binom{12}{2} \times 4 \times 4$$

(A-K) 4 suites (A-K-1) 4 suits 5 cards
3 same 2 same 4 card scale

$$13 \times \frac{4!}{3!(1)!} \times \frac{12!}{2!(10)!} \times 4 \times 4 = 54912 \text{ hands}$$

(e) Straight: The five cards have consecutive numerical values, such as 7-8-9-10-jack. Treat ace as being higher than king but not less than 2. The suites are irrelevant.

9 (2,3,4,5,6,7,8,9,10) starting card of straight
4^5 (number of different hands that compose a straight)

$9 \times 4^5 = 9216$ hands