CECS 228 Name:

Lab 10.2 ID: Date:  
Objective:

* Be able to use counting techniques: permutations and combinations

Exercise 1: A **circular r-permutation** of n people is a seating of r of these n people around a circular table, where seatings are considered to be the same if they can be obtained from each other by rotating the table.   
a. Find the number of circular 3-permutations of 5 people.  
P(5, 3) / 3

b. Find a formula for the number of circular r-permutations of n people.

P(n, r) / r

Exercise 2: Suppose that a department contains 10 men and 15 women. How many ways are there to form a committee with six members if it must have more women than men?

C(15, 6) + C(15, 5)C(10, 1) + C(15, 4)C(10, 2)

Exercise 3: One hundred tickets, numbered 1, 2, 3, . . . , 100, are sold to 100 different people for a drawing. Four different prizes are awarded, including a grand prize (a trip to Tahiti).How many ways are there to award the prizes if

a) there are no restrictions?

P(100, 4)

b) the person holding ticket 47 wins one of the prizes?

4 ∙ P(99, 3)

c) the people holding tickets 19 and 47 both win prizes?

P(4, 2) ∙ P(98, 2)

d) the people holding tickets 19, 47, 73, and 97 all win prizes?

4!

e) the grand prize winner is a person holding ticket 19, 47, 73, or 97?

4 ∙ P(99, 3)

Exercise 4: A coin is flipped 10 times where each flip comes up either heads or tails. How many possible outcomes

a) are there in total?  
210

b) contain exactly two heads?  
C(10,2)

c) contain at most three tails?  
C(10, 0) + C(10,1) + C(10, 2) + C(10, 3)

d) contain the same number of heads and tails?

C(10, 5)

Exercise 5: A club has 25 members.

a) How many ways are there to choose four members of the club to serve on an executive committee?

C(25, 4)

b) How many ways are there to choose a president, vice president, secretary, and treasurer of the club, where no person can hold more than one office?

P(25, 4)

Exercise 6: How many permutations of the letters ABCDEFG contain

a) the string BCD?

5!

b) the string CFGA?

4!

c) the strings BA and GF?

5!