Handout: Problem Set #2
PREDICT 401: Introduction to Statistical Analysis

1. Shelter Demographics

A survey of the homeless shelters in your city asked people where they had stayed the night before. In your shelter, the results were as follows:

	Men (150 people)		Women (70 people)	
Street	40%	Street	28.57%	
Friend	15.33%	Friends	18.57%	
Family	14.0%	Family	17.14%	
Own Apartment	12.0%	Own Apartment	14.3%	
Other Institution	18.67%	Other Institution	21.43%	

Assume that each person's decision about where to spend the night is independent of all the others. Based on this information, answer the following questions.

a) What is the probability that a person in your shelter is a man?

b) What is the probability that a person in your shelter is a man who spent last night on the street?

c) What is the probability that a person in your shelter spent last night on the street?

d) What is the probability that a person in your shelter is either a man or someone who spent last night on the street?

e) What is the probability that a woman in your shelter either spent last night in her own apartment or with her family (not in her own apartment)?

f) Three people come into your shelter. What is the probability that none of them spent last night on the street?

2. Accounting for Absences

You are staffing a day program at a Community Mental Health Center. Suppose that prior experience shows that on any given day the probability of at least one client being absent from the program (which takes place on both weekdays and weekends) is 0.10. Assume that the probability of at least one client being absent is the same for every day regardless of what happens on the other days. Based on this information, answer the following questions.

a) What is the probability that no one is absent during the first four days of a week?

b) What is the probability that Thursday is the first day that someone is absent? (Assume that the week begins on a Monday.)

c) What is the probability that, during one week, someone is absent on Tuesday and someone is absent on Thursday but there are no absences the other days?

d) What is the probability that in a week (7 days), there is only one day that someone is absent?

e) Consider the first two days. What is the probability of absences on both days? What is the probability that someone is absent on one or both days?

3. STDs among high-risk pregnant women

Suppose a survey of the incidence of sexually transmitted diseases (STDs) among pregnant women in a high risk clinical setting found that disease A (STDA) occurred in 10% of the sample and that disease B (STDB) occurred among 5% of women in the sample. In addition, suppose that among those women with STDA, 30% had STDB.

a) Are A and B mutually exclusive? Why or why not?

b) Are A and B independent? Why or why not?

Suppose we choose a woman randomly from the survey participants.

a) C. What is the probability she has both diseases?

b) D. What is the probability that she has neither disease?

4. Employee Data

For this problem, use the SPSS database called "Employee data.sav." Assume that this is a set of data on all employees in a particular company.

a) How many total observations comprise this data set?

b) If a person were randomly selected from this sample, what are the chances of selecting a male?

c) Of those who make more than $50,000, what are the chances that someone chosen at random would be male?