2. A jail has an inmate population with a mean number of prior arrests of 6 and a standard deviation of 2. Arrests are distributed normally.

a) What is the z-score of inmates with 1, 3, 6, and 7 prior arrests?

b) Would a new inmate with nine prior arrests be in the upper 5% of the arrest distribution?

c) Would a new inmate with two prior arrests be in the lowest 5% of the arrest distribution?

d) What percent of the inmate population would have between 2 and 5 prior arrests?

e) What percent of the inmate population would have 10 or more prior arrests?

f) What percent of the inmate population would have 0 prior arrests?

g) Suppose you draw a random sample of 225 people from the inmate population and obtain a sample mean of 2.3 and a standard deviation of 1.9. How unusual is this sample mean? What percent of random samples of size 225 would we expect to have a sample mean greater than 2.3?

h) For the sample mentioned above, construct a 95% confidence interval. Does it contain the population mean? Why or why not?

3. Prior experience suggests that about 60% of admission offers to Ph.D. students result in enrollment. A particular criminology department wants to make sure they have at least 4 Ph.D. students in the incoming class, but no more than 7.

a) What is the minimum number of offers they should make to ensure that the chance of having less than 4 students is less than 15%?

b) How many offers can they make while keeping the risk of more than 7 acceptances below 5%?

c) How many offers should they make if they want to maximize the probability of having 5 accepts? What is the probability of 5 accepts given this number of offers?

d) How many offers should they make to maximize the probability of having 4 to 6 accepts? What is the probability of 4 to 6 accepts given this number of offers?

e) Suppose 10 offers are made. How many students do we expect to accept?

f) What is the probability that exactly this number of students would accept?