HW 6-1 (Due Oct. 18, 2016) **Name:**

Print then work on it directly. Staple HW 6-1 and 6-2 together.

Problem 1 Prove that:

3.121 Let Y denote a random variable that has a Poisson distribution with mean $\lambda = 2$. Find

a $P(Y = 4)$.

b $P(Y \geq 4)$.

c $P(Y < 4)$.

d $P(Y \geq 4 | Y \geq 2)$.

Problem 2

3.123 The random variable Y has a Poisson distribution and is such that $p(0) = p(1)$. What is $p(2)$?

Problem 3

3.122 Customers arrive at a checkout counter in a department store according to a Poisson distribution at an average of seven per hour. During a given hour, what are the probabilities that

a no more than three customers arrive?

b at least two customers arrive?

c exactly five customers arrive?

3.125 Refer to Exercise 3.122. If it takes approximately ten minutes to serve each customer, find the mean and variance of the total service time for customers arriving during a 1-hour period. (Assume that a sufficient number of servers are available so that no customer must wait for service.) Is it likely that the total service time will exceed 2.5 hours?

Problem 4

3.126 Refer to Exercise 3.122. Assume that arrivals occur according to a Poisson process with an average of seven per hour. What is the probability that exactly two customers arrive in the two-hour period of time between

a 2:00 P.M. and 4:00 P.M. (one continuous two-hour period)?

b 1:00 P.M. and 2:00 P.M. or between 3:00 P.M. and 4:00 P.M. (two separate one-hour periods that total two hours)?

Problem 5

3.130 A parking lot has two entrances. Cars arrive at entrance I according to a Poisson distribution at an average of three per hour and at entrance II according to a Poisson distribution at an average of four per hour. What is the probability that a total of three cars will arrive at the parking lot in a given hour? (Assume that the numbers of cars arriving at the two entrances are independent.)

Problem 6

3.131 The number of knots in a particular type of wood has a Poisson distribution with an average of 1.5 knots in 10 cubic feet of the wood. Find the probability that a 10-cubic-foot block of the wood has at most 1 knot.