Worksheet 6 – Chapter 4a

Answer the following questions logically and legibly. Show work and give probability statements where appropriate.

- 1. Classify the following random variables according to whether it is discrete or continuous
 - a. The number of cups of coffee sold in a cafeteria during lunch

discrete

b. The height of a player on a basketball team

continuous

c. The blood pressures of a group of students the day before the final exam

continuous

d. The temperature in degrees Fahrenheit on July 4th in Juneau, Alaska

continuous

e. The number of goals scored in a soccer game

discrete

f. The speed of a car on a Los Angeles freeway during rush hour traffic

continuous

2. Calculate the mean and standard deviation for the discrete probability distribution shown here.

Х	2	3	5	7
P(X)	.2	.3	.3	.2

 $\sigma^2 = 20.8 - 4.2^2 = 3.16$

X	P (x)	xP (x)	\mathbf{x}^2	$x^2 P(x)$
2	.2	.4	4	0.
3	.3	.9	9	2.7
5	.3	1.5	25	7.5
7	.2	1.4	49	9.8
		4.2		20.8

Mean = μ = 4.2



You may want to use the Binomial and Poisson equations in EXCEL to answer these questions (pages 64-70 in Excel Manual). Be sure to show your work and give proper probability statements.

- 3. A student majoring in accounting is trying to decide on the number of firms to which he should apply. Given his work experience and grades, he can expect to receive a job offer from 70% of the firms to which he applies. The student decides to apply to only four firms. Let X be the number of job offers the student receives. X then follows a binomial distribution.
 - a. What is the probability that he receives at least one job offer?

$$P(X \ge 1) = 1 - P(X = 0) = 1 - {\binom{4}{0}} (0.70)^0 (0.30)^4$$
$$1 - 0.0081 = 0.9919$$

b. What is the probability that he receives a job offer from all four firms?

$$P(X=4) = {\binom{4}{4}} (0.70)^4 (0.30)^0 = 0.2401$$

c. How many job offers should he expect to receive?

 $\mu = np = (4)(0.7) = 2.8 \, jobs$

- 4. Officer Thompson of the Bay Ridge Police Department works the graveyard shift. He averages 4.5 calls per shift from his dispatcher. Assume the number of calls follows a Poisson distribution.
 - a. What is the probability that Officer Thompson gets fewer than 2 calls in a shift?

$$P(X < 2) = P(X = 0) + P(X = 1)$$

= $\frac{4.5^{\circ}e^{-4.5}}{0!} + \frac{4.5^{\circ}e^{-4.5}}{1!} = 0.0111 + .0499$
= 0.610

b. What is the probability that Officer Thompson gets at least one call in a shift?

$$P(X \ge 1) = 1 - P(X = 0)$$

= $1 - \frac{4.5^{\circ} e^{-4.5}}{0!} = 1 - 0.0111$
= 0.9889

c. What is the probability that he gets 20 calls in a week (five shifts)? (Hint: if there is on average 4.5 calls per shift and it is the same for each shift you would expect an average of 4.5*2 = 9 in two shifts)



d. What is the mean and standard deviation for the number of calls he gets in a week (5 shifts)?