NAME **Homework 2** **Spring 2017**

Due date: Thursday February 9, 2017 **Sta 3381**

1. Based on recent records, Harris County Sheriff's Office and Houston Police Department has measured how many crimes can be committed in one hour. The table shows the frequency of how many crimes can be committed in that certain hour.

x	$P(x)$
0	.09
1	.32
2	.25
3	.13
4	.21

a. What is the probability that zero crimes would occur on that given hour?

b. What is the probability that two or less crimes would occur on that given hour?

c. What is the probability that three or more crimes would be committed in that given hour?

2. For each of the following case, find probability distribution of X.

a. $P(X = x) = \frac{1}{10}(x - 4), x = 5, 6, 7, 8.$

b. $P(X = x) = \frac{1}{15}(x + 2), x = -1, 0, 1, 2, 3.$

c. $P(X = x) = \frac{8}{7}\frac{1}{2^x}, x = 1, 2, 3.$

d. $P(X = x) = \frac{1}{16}\binom{4}{x}, x = 0, 1, 2, 3, 4.$

3. The Fire Department is bidding for a contract with the San Antonio Police Department to clean up a major highway crime scene. The Fire Department determined that they will have a net profit of $\$4,000$ if they get the contract and a net loss of \$92 if they fail the offer. If the probability of the Fire Department getting their contract is .4, calculate the expected return for the fire department.

4. A prison cook proposed a distribution for the number of meals served per day to the same of people.

x	$P(x)$
1	.3
2	.4
3	.2
4	.1

a. Find the probability of the number of meals served per day is less than 3.

b. Find the mean number of meals served per day.

c. Find the standard deviation number of meals served per day.

5. A young man, age 20 years old, buys a whole life insurance policy with a face value of $\$100,000$ and a yearly premium of \$300. The chance of this young man will live during a year is 0.998885 (based on The Life Table for males, US 2009). What is the young male expected value?

6. A stewardess constructed a distribution for the number of customers ordering a particular meal on the flight to Florida.

x	$P(x)$
3	.5
5	.3
7	.1
9	.1

a. Find the mean.
b. Find the standard deviation.
c. Are 8 customers ordering meals unusual?

7. According to the data provided by the USGS on the water level rise during floods in the San Jacinto River since January of 2015, the data suggests that one plausible model for $X =$ Water Level Rise (in meters), is a population distribution having a mean of 1.3m and variance $= 1.6m^2$. Determine the mean and standard error for a random sample size of:
a. 36 readings.
b. 100 readings.
c. 225 readings.

8. A random sample of size 2 is selected with replacement from the set of numbers: (0, 4, 8).
a. List all the possible samples and evaluate the mean and sample variance for each.
b. Determine the sampling distribution of $\overline{X}$.
c. Determine the sampling distribution of sample variance

9. A random sample size of 2 is selected, with replacement, from the set of numbers $\{0, 1, 3, 5\}$
a. List all possible samples and evaluate $\bar{x}$ and S^2.
b. Determine sampling distribution $\bar{x}$.
c. Determine sampling distribution S^2.

10. A population has a distribution of

Value	Probability
0	.5
4	.2
5	.3

Let X_1 and X_2 be independent and each has the same distribution as the population

a. Determine the sampling distribution of $\bar{X} = (X_1 + X_2)/2$.

b. Find the mean of $\bar{X}$.

c. If the sample size is increased to 34, give the mean and variance of $\bar{X}$.