CONCORDIA UNIVERSITY
Department of Economics

ECON 221/4 SECTIONS E, G and FF
STATISTICAL METHODS I
WINTER 2017 – TUTORIAL 1
Friday, February 17, 2017

Name: **I.D:** **Section:**

---

1. In Hapolonia, 20 percent of all sheep farms exceed 160 acres, 60 percent of all sheep farms are owned by people over the age of 50 and 55 percent of all sheep farms over 160 acres are owned by people over the age of 50.

   a. Calculate the probability that a randomly chosen farm exceeds 160 acres and is owned by a person over the age of 50.

   b. Calculate the probability that a randomly chosen farm is either bigger than 160 acres or is owned by a person over the age of 50 (or both).

   c. Calculate the probability that a farm owned by a person over the age of 50 exceeds 160 acres.

   d. Determine whether farm size and the age of the owner are statistically independent.

2. Ten students who received an A and 6 students who received a B asked Professor Hapoleon for a letter of recommendation. He will write letters for only four students.

   a. Calculate the probability that a random selection of students contains two As and two Bs.

3. Michelle eats sushi almost every day. The number of pieces she eats varies as follows:

Number of pieces	0	1	2	3	4	5	6
Probability	0.05	0.10	0.20	0.20	0.20	0.15	0.10

   a. Calculate the cumulative probability distribution.

Number of pieces	0	1	2	3	4	5	6
Probability							

   b. Calculate the probability that she eats no more than four pieces.

   c. Calculate the number of pieces she eats on a typical day.

   d. Calculate the variance in the number of pieces she eats on a typical day.

Each piece costs $4.

e. Calculate how much she spends on sushi on a typical day.

f. Calculate the variance in how much she spends on sushi on a typical day.

4. The probability that a Tootie bird is flying upside down is 0.3. Last week 14 random Tootie birds were spotted.

   a. Calculate the probability that less than seven were flying upside down.

   b. Calculate the expected number of Tootie birds flying upside down.

   c. Calculate the variance in the total number of Tootie birds flying upside down.

5. Hap calls Zoë an average of 2.6 times a day, according to a Poisson distribution.

   a. Calculate the probability that he calls her less than two times tomorrow.

6. Consider the following joint probability distribution:

		X	
		1	2
Y	1	0.2	0.3
	2	0.3	0.2

   a. Calculate the marginal probability distributions for X and Y.

   b. Calculate the expected values of X and Y.

   c. Calculate the variances of X and Y.

d. Calculate the covariance of X and Y.

e. Calculate the correlation for X and Y.

7. The random variable X follows a normal distribution with $\mu = 50$ and $\sigma^2 = 64$.

   a. Calculate $\Pr(34 < X < 62)$.

   b. Calculate the values of x_0 and x_1 that are equidistant from the mean such that $\Pr(x_0 < X < x_1) = 0.796$.

8. A boat leaving Corduroy Island takes an average of 5 minutes to get to the mainland and follows an exponential distribution.

   a. Calculate the probability that a given boat takes between 1 and 4 minutes.

9. A random sample of 10 students sleep the following number of hours per day:

6	8	10	12	14	9	11	7	13	11

a. Calculate the 65^{th} percentile.

b. Calculate the sample mean.

c. Calculate the sample variance.

10. A random sample of 100 Snapchat users was asked how many best friends they had. Their responses are as follows:

Number of best friends	0.00 – 1.99	2.00 – 3.99	4.00 – 5.99	6.00 – 7.99
Number of Snapchat users	10	20	30	40

a. Calculate the sample mean.

b. Calculate the sample standard deviation.