CALCULATIONS (40 points):

Please use pencil, and put all of your answers on this paper. You must do all of the questions, and show all appropriate work. Please draw a circle around each answer unless otherwise instructed.

1. (30 points) A researcher investigated how many databases a sample of clients searched in at a community center with links to the local community college. These patrons used the following number of databases during the observation period:

   1, 0, 0, 4, 3, 4, 2, 3, 3, 8, 4, 1, 0, 1, 3, 1, 1, 6.

   (a) What is the case in this example? (2 points)

   (b) What is the variable of interest? (2 points)

   (c) In the space below, generate the full frequency distribution of the sample using class examples as models. Do not circle the frequency distribution. (6 points)

   (d) What is the mean of the distribution? (2 points)

   (e) What is the standard deviation of the distribution? (3 points)
(f) Generate a 99% confidence interval on $\mu$. (6 points)

(g) Draw the frequency polygon for this distribution. Do not circle it. (3 points)

(h) Draw the box plot of the distribution. Do not circle it. (6 points)
2. (10 points) A behavioral scientist wanted to more fully understand people’s use of networked communication applications, focusing on the participants’ educational level. She identified the mean number of applications used by three groups of people: people with only a high school education/GED or less ($\mu_1$), people with only some college experience ($\mu_2$), and people with some graduate experience ($\mu_3$).

(a) Using a $\chi^2$ analysis, test the following null hypothesis for the data below. (8 points)

$H_0: \mu_1 = \mu_2 = \mu_3$ ($\alpha = 0.01$).

Of the people in the first educational group, 22 used two or fewer applications, 16 used three to five, and 19 used more than five. In the second educational group, 34 used two or fewer applications, 18 used three to five, and 23 used more than five. In the last educational group, 10 used two or fewer applications, 8 used three to five, and 17 used more than five.

(b) Can we use phi as an effect size index for this data set? Why or why not? (2 points)
CONCEPTS (20 points):

Please use pen, and put all of your answers on this paper. Use only the space provided.

I. (5 points) Please define five (5) of the following terms (1 point each).

Unit of analysis

Standard deviation

Informed consent

Parameter

Sampling distribution of the mean

Coefficient of risk

Parsimony

Informant

II. (3 points) Please mark each of the statements below as true (T) or False (F). (1 point each)

Inferential statistics can help us estimate the amount of noise in data. ______

Member checking helps to determine the size of a sample. ______

We use operational definitions to address ethical problems in research. ______
III. (12 points) Respond to two (2) of the following questions or statements. Limit your answer to the space provided. (6 points each)

a. What is the relationship between reliability and validity of measures?

b. What does it mean to do statistical inference?
c. When reading others’ research, what are the important responsibilities of the skeptical, informed reader?