Assignment 1

Statistics for Social Science (201-401-DW)
Instructor: Emilie Richer

Instructions:

- The assignment is due at the beginning of class 8:30am on Wednesday, February 15, 2017. A late penalty will be applied to assignments submitted later in the day.
- Show all your work. Some solutions will require more written explanation than others. If you use your calculator to compute the mean and SD you do not have to show your work.
- You may work together, however your written solutions should be done on an individual basis. Solutions that are too similar to those of one of your classmates' will be marked zero.
- Your assignment **does not have to be typed.**
- The assignment is comprised of 9 questions and marked out of a total of **38 marks.**

[QUESTION 1] (5 marks)

a. Describe and explain the difference between the mean and the median.
b. Make up an example (not from our lectures) in which the median would be the preferred measure of central tendency.
c. Make up an example (not from our lectures) in which the mean would be the preferred measure of central tendency.

[QUESTION 5] (5 marks)

A researcher is studying the amygdala (a part of the brain involved in emotion). Twenty-five (25) participants in a particular fMRI brain scan study are measured for the increase in activation of their amygdala while they are viewing pictures of violent scenes. The activation increases measured are the following:

0.43 0.32 0.64 0.21 0.29 0.51 0.00 0.19 0.44 0.55 0.31
0.27 0.50 0.40 0.47 0.30 0.19 0.75 0.31 0.10 0.15 0.27
0.41 0.29 0.21

a. Compute the mean and standard deviation for this sample.
b. Explain what you have done and what the results mean as if you were explaining to a person who has never had a course in statistics.

[QUESTION 3] (4 marks)

Make up two sets of data containing 5 data points each: a. one with the mean greater than the median, b. one with the median and the mean the same.

[QUESTION 4] (1.5 marks)
A distribution has a mean of 200 and a standard deviation of 50. A person has a Z-score of 1.26, what is the person's actual score.

[QUESTION 5] (6 marks)
Six months after a divorce, a former wife and husband each take a test that measures divorce adjustment. The higher the score, the better a person has adjusted to divorce. The former wife's score is 63, and the former husband's score is 59. Overall, in the population, the mean score for divorced women on this test is 60 with standard deviation 6, the mean score for divorced men is 55 with standard deviation 4.

Between the former wife and husband who took the test, which of the two has adjusted better to the divorce in relation to other divorced people of the same gender? Explain your answer as if you were explaining to a person who has never had a course in statistics.

[QUESTION 6] (3.5 marks)
You are conducting a survey at a College with 800 students, 50 faculty members, and 150 administrators. Each of these 1,000 individuals has a single email address listed in the online campus directory. Suppose you were to select one email address at random. What is the probability it would be the email of:
a. a student;
b. a faculty member;
c. an administrator;
d. a faculty member or administrator;
e. anyone but an administrator?

[QUESTION 7] (3 marks)
Consider the two events A = "attending classes regularly" and P = "passing all classes". Would you guess these events to be disjoint? independent?

[QUESTION 8] (6 marks)
Consider a cegep class with a mean of 71.2, standard deviation of 5.1. The average of sec IV and V compulsory courses for the students in the class is 78 (refer to your notes for the R-score formula).
a. What is the R-score of a student in the class whose grade is 86?
b. Compare and discuss the effects on the R-score of (A) a doubling of the standard deviation and (B) a decreasing by 7 of the students' average of sec IV and V compulsory courses
- for a student with a grade of 86 in the class;
- for a student with a grade of 51 in the class.

[QUESTION 8] (4.5 marks)
The 268 first year students registered in a Social Science Program at Dawson College fill out a survey regarding their interest in two subjects. The survey and its results are showed below:

Subject Interest Survey

Which of the following subject(s) would you like to study over the course of your College studies (check all boxes that apply):

☐ Biology
☐ Mathematics

Results of Subject Interest Survey

Number of students who checked box:

Biology only (67)
Mathematics only (81)
Biology and Mathematics (34)

Let M be the event "student checked the mathematics box"
Let B be the event "student checked the biology box"

If one of the 268 Social Science students is picked at random, compute the probability of the following events:

a. $P(M)$
b. $P(B)$
c. $P(M \cap B)$
d. $P(M \cup B)$
e. $P(B|M)$
f. $P(M|B)$

[QUESTION 9] (1.5 marks)
Fifty percent of students at a particular college are commuters. Of those, 10% bike to school Find the probability that a student is a commuter and bikes to school.