Assignment 3
Statistics for Social Science (201-401-DW)
Instructor: Emilie Richer

Instructions:
- The assignment is due at the beginning of class 8:30am on Wednesday, May 3rd, 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 **50 marks.**

[QUESTION 1] (5 marks)
The Institute of Educational Sciences published results of the Trends in International Math and Science Study for 2003. The sample mean and standard deviation mathematics scores for students from the United States were 518 and 80 respectively, based on a sample of 10 students. The sample mean and standard deviation mathematics scores for students from Hong Kong were 575 and 70 respectively, based on a sample of 12 students. Test at level of significance 0.01 whether the average mathematics scores from students from the US are lower than those of students from Hong Kong.

[QUESTION 2] (5 marks)
The US Census Bureau tracks trends in women's ownership of businesses. A random sample of 100 Ohio businesses showed 34 that were woman-owned. A sample of 200 New Jersey businesses showed 64 that were woman-owned. Test whether the population proportions of female-owned businesses in Ohio is greater than that of New Jersey using level of significance 0.1.

[QUESTION 3] (3 marks)
Among a simple random sample of 331 American adults who do not have a four-year college degree and are not currently enrolled in school, 48% said they decided not to go to college because they could not afford school.

A newspaper article states that only a minority of the Americans who decide not to go to college do so because they cannot afford it and uses the estimate from this survey as evidence. Conduct a hypothesis test at significance 0.05 to determine if the newspaper article had strong enough evidence to support its claim.

[QUESTION 4] (5 marks)
A student group maintains that each day the average student must travel for at least 25 minutes one way to reach college. The college admissions office obtained a random sample of 31 one-way travel times from students. The sample had a mean of 19 minutes and a sample standard deviation of 9.6 Minutes.

[QUESTION 5] (7 marks)
The length of major league baseball games are approximately normally distributed and last on average 2 hours and 50.1 minutes with a standard deviation of 21 minutes. It has been claimed that New York Yankees baseball games last, on average, longer than the games of the other major league teams. To test the truth of this statement a sample of eight Yankee games was randomly identified and the length of each game obtained (in minutes):

199 196 202 213 187 169 169 188

At the 0.05 significance level, does this data show sufficient evidence to conclude that the mean time of Yankee baseball games is longer than that of other major league baseball teams?

[QUESTION 6] (10 marks)
A random sample of 200 Dawson students yields a current average of 62% in their English. We know that average English class grades have a standard deviation of $\sigma = 7$. Can we conclude that the average Dawson student English grade is a passing one (60%)? Conduct a test at 0.1 significance.

[QUESTION 7] (5 marks)
The distribution of passenger vehicle speeds traveling on the Interstate 5 Freeway (I-5) in California is nearly normal with a mean of 72.6 miles/hour and a standard deviation of 4.78 miles/hour.
(a) What percent of passenger vehicles travel slower than 80 miles/hour?
(b) What percent of passenger vehicles travel between 60 to 80 miles/hour?
(c) How fast do the fastest 5% of passenger vehicles travel?
(d) The speed limit on this stretch of the I-5 is 70 miles/hour. Approximate what percentage of the passenger vehicles travel above the speed limit on this stretch of the I-5.

[QUESTION 8] (5 marks)
SAT scores (out of 2400) are distributes normally with a mean of 1500 and a standard deviation of 300. Suppose a school council awards a certificate of excellence to all students who score at least 1900 on the SAT, and suppose we pick one of the recognized students at random. What is the probability this student's score will be at least 2100?

[QUESTION 9] (5 marks)
A TV network claims that 20% of all available viewers watch its evening news. If this is true, what is the probability that at most 450 viewers in a pool of 2500 viewers watch its news?