

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 6 questions and marked out of a total of **35 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. **Assume normality**.

[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. Test at 0.1 significance whether the student group's claim is correct.

[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.