DANA 4800 (001)

Homework #4

Due: 11:59 pm on July 13th, 2025 Submitted to: BrightSpace Homework Folder

Please read these instructions before submitting your homework.

1. **Format**: Please convert all work in Word to PDF.
2. **R Output**: If you have R Output, please copy and paste the output to the corresponding part of the Word document.
3. **Submission**: No email submission will be accepted regardless of the circumstances.
4. **Number of Submission**: You are allowed to submit your homework as many times as you want. But only the latest version of your submission will be marked.
5. **Order of Work**: All work must be submitted in the same order of the questions. It is suggested that you use a brand new page for a different question, especially true for hand-written work.
6. **Filename**: Please name your file in the following format:

“DANA4800\_Lastname\_Firstname\_HW#.pdf”. For example, my first assignment would have the name “DANA4800\_Lo\_Michael\_HW1.pdf”.

1. **Last Advice**: Internet connections do go off, computers do break down, or other unexpected events do occur when they are least expected. The onus is squarely on you to submit it on time. No excuses.

**Note: Failure to comply with any of the above will result in loss of marks.**

1. A survey has been conducted to determine what percentage of Canadian who have smoked

marijuana during their teenage years (13-19 years old). A random sample of 1,000 Canadians was drawn, and it is reported that 210 of them did smoke marijuana during their teenage years.

* 1. Identify the parameter of interest. **[2 marks]**
  2. Estimate the above parameter using a 95% confidence interval. **[2+2 marks]**

Note: Make sure you understand that checking assumptions is part of this procedure.

1. One way to know the efficiency of international airports is to measure the percentage of flights that leave the airport on time on a daily basis. From a random sample of 100 days, it was found that an average of 81.5% of flights leave YVR (Vancouver International Airport) on time and a standard deviation of 4.5%. From past experience, it is known that the percentage of flights that leave YVR on time has a Normal distribution.
   1. Identify the subjects of interest. **[1 mark]**
   2. Provide a description of the parameter of interest in this study. **[2 marks]**
   3. Construct a 98% confidence interval of the parameter in part (a). **[3 marks]**
2. According to previous study in 2016, 42% of Canadian employees had extended health care

coverage from their employers. With organization putting more focus on the employees’ physical and mental health, an HR personnel would like to see if the number has gone up since. A recent study found that 180 out of 400 randomly sampled workers have the extended health care

coverage from their employer’s health care plan.

* 1. Identify the parameter of interest. **[2 bonus marks]**
  2. Set up the null hypothesis and the alternative hypothesis. **[2 bonus marks]**
  3. Calculate the test statistic and find the p-value. **[4 bonus marks]**

Note: Make sure you understand checking conditions is part of the procedure.

* 1. Make an appropriate conclusion in plain English. Use 𝛼 = 0.01. **[2 bonus marks]**

1. At ABC University, the average scholarship examination scores for freshman applications have been 900. Every year, the Associate Dean uses a sample of applications to determine whether the average examination score for the new freshman applications is different from 900. A random sample of 200 applications was drawn this year and the average score was found to be 935 and a standard deviation of 180. Historically, it is known that the exam score has a left-skewed distribution.
   1. Identify the parameter of interest. **[2 marks]**
   2. Set up the null hypothesis and the alternative hypothesis. **[2 marks]**
   3. Calculate the test statistic and find the p-value. **[2 marks]**
   4. Note that the p-value is only an approximation. Briefly explain why. Also briefly justify why we can still make a valid conclusion in the following part? **[1+2 marks]**
   5. Draw a conclusion so that the Dean could understand. Use 5% significance level. **[2 marks]**