Homework 1

POM 500 Statistical Analysis

Note: Attempt all questions as per rubric. Problems including case study has a weightage of 10 marks each. The maximum you can score is 50. Use Excel function wherever possible.

Problem-1

Using 'VehicleFailureData' available on the course website, answer the following:

a) Classify each variable as nominal, ordinal, interval or ratio.
b) Identify qualitative and quantitative variables.
c) How many vehicles failed in month-9? (Write Excel function)
d) What was the maximum labor cost? (Write Excel function)
e) What was the total failure cost for the data available? (Write Excel function)

Problem-2

A seven-year medical research study reported that women whose mothers took the drug DES during pregnancy were *twice* as likely to develop tissue abnormalities that might lead to cancer as were women whose mothers did not take the drug.

a) This study involved the comparison of two populations. What were the populations?
b) Do you suppose the data were obtained in a survey or an experiment?
c) For the population of women whose mothers took the drug DES during pregnancy, a sample of 3980 women showed 63 developed tissue abnormalities that might lead to cancer. Provide a descriptive statistic that could be used to estimate the number of women out of 1000 in this population who have tissue abnormalities.
d) For the population of women whose mothers did not take the drug DES during pregnancy, what is the estimate of the number of women out of 1000 who would be expected to have tissue abnormalities?
e) Medical studies often use a relatively large sample (in this case, 3980). Why?

Problem-3

ACNielsen conducts weekly surveys of television viewing throughout the United States. The ACNielsen statistical rating indicates the size of the viewing audience for each major network television program. Rankings of the television program and of the viewing audience market share for each network are published each week.

a) What is AC Nielsen attempting to measure?
b) What is the population?
c) Why would a sample be used in this situation?
d) What kinds of decisions or actions are based on the ACNielsen studies?

Problem-4

Using 'VehicleFailureData', summarize the data for failures in top 10 (maximum number of vehicle failures) states by constructing the following:

a) Relative and percent frequency distributions
b) Bar chart
c) Pie chart
d) Find top three states with maximum number of vehicles failures.

Case Study: Movie Theater Releases

The movie industry is a competitive business. More than 50 studios produce hundreds of new movies for theater release each year, and the financial success of each movie varies considerably. The opening weekend gross sales ($ millions), the total gross sales ($ millions), the number of theaters the movie was shown in, and the number of weeks the movie was in release are common variables used to measure the success of a movie released to theaters. Data collected for the top 100 theater movies released in 2016 are contained in the file Movies2016 (Box Office Mojo website). Table below shows the data for the first 10 movies in this file.

Performance Data for Ten 2016 Movies Released to Theaters.

Movie Title	Opening Gross Sales ($ Million)	Total Gross Sales ($ Million)	Number of Theaters	Weeks in Release
Rogue One: A Star Wars Story	155.08	532.18	4,157	20
Finding Dory	135.06	486.30	4,305	25
Captain America: Civil War	179.14	408.08	4,226	20
The Secret Life of Pets	104.35	368.38	4,381	25
The Jungle Book	103.26	364.00	4,144	24
Deadpool	132.43	363.07	3,856	18
Zootopia	75.06	341.27	3,959	22
Batman v Superman: Dawn of Justice	166.01	330.36	4,256	12
Suicide Squad	133.68	325.10	4,255	14
Sing	35.26	270.40	4,029	20

Managerial Report

Use the tabular and graphical methods of descriptive statistics to learn how these variables contribute to the success of a motion picture. Include the following in your report.

a) Tabular and graphical summaries for each of the four variables along with a discussion of what each summary tells us about the movies that are released to theaters.
b) A scatter diagram to explore the relationship between Total Gross Sales and Opening Weekend Gross Sales. Discuss.

c) A scatter diagram to explore the relationship between Total Gross Sales and Number of Theaters. Discuss.

d) A scatter diagram to explore the relationship between Total Gross Sales and Number of Weeks in Release. Discuss.