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Instructions: Fill out your full name and SMC username above. Answer each question in its respective following space on this answer sheet. **Give a sufficient yet succinct answer for each question, and show figures / tables / graphs on this same sheet when appropriate or explicitly requested.** After completion, rename and save this file as **“Assignment 4\_BUSAD 040\_*your full name*” in either MS Word (.docx or .doc) or PDF (.pdf) format**, then upload and submit it on Moodle by the due date. No other file formats will be accepted. Late submission will not be accepted.

Note: This **answer sheet** together with the **one** completed **Excel file** “**DJIASP500.xlsx**” are the two files you need to submit on Moodle after completion.

**Total possible points: 110 points**

1. **Chapter 4 questions (70 points in total)**

1.1 Visa Card USA studied how frequently young consumers, ages 18 to 24, use plastic (debit and credit) cards in making purchases (Associated Press, January 16, 2006). The results of the study provided the following probabilities. (20 points in total)

• The probability that a consumer uses a plastic card when making a purchase is .37.

• Given that the consumer uses a plastic card, there is a .19 probability that the consumer is 18 to 24 years old.

• Given that the consumer uses a plastic card, there is a .81 probability that the consumer is more than 24 years old.

U.S. Census Bureau data show that 14% of the consumer population is 18 to 24 years old.

Let C = event consumer uses a plastic card

B = event consumer is 18 to 24 years old

Bc = event consumer is over 24 years old

a. Given the consumer is 18 to 24 years old, what is the probability that the consumer uses a plastic card? (5 points)

.19 probability

b. Given the consumer is over 24 years old, what is the probability that the consumer uses a plastic card? (5 points)

.81 probability

c. What is the interpretation of the probabilities shown in parts (a) and (b)? (5 points)

Lots of older adults go for a plastic cards where as younger users stick to cash.

d. Should companies such as Visa, MasterCard, and Discover make plastic cards available to the 18 to 24 year old age group before these consumers have had time to establish a credit history? If no, why? If yes, what restrictions might the companies place on this age group? (5 points)

No because there isn’t a real need or demand for credit usage.

1.2 A consulting firm submitted a bid for a large research project. The firm’s management initially felt they had a 50–50 chance of getting the project. However, the agency to which the bid was submitted subsequently requested additional information on the bid. Past experience indicates that for 75% of the successful bids and 40% of the unsuccessful bids the agency requested additional information. (20 points in total)

Let S1 = successful, S2 = not successful, and B = request received for additional information.

a. What is the prior probability of the bid being successful (that is, prior to the request for additional information)? (5 points)

b. What is the conditional probability of a request for additional information given that the bid will ultimately be successful? (5 points)

c. Compute the posterior probability that the bid will be successful given a request for additional information. (10 points)

1.3 In an article about investment alternatives, Money magazine report that drug stocks provide a potential for long-term growth, with over 50% of the adult population of the United States taking prescription drugs on a regular basis. For adults age 65 and older, 82% take prescription drugs regularly. For adults age 18 to 64, 49% take prescription drugs regularly. The 18–64 age group accounts for 83.5% of the adult population (Statistical Abstract of the United States, 2008). (10 points in total)

Let A = age 65 or older

Ac = age 18-64

D = takes drugs regularly

a. What is the probability that a randomly selected adult is 65 or older? (3 points)

b. Given an adult takes prescription drugs regularly, what is the probability that the adult is 65 or older? (7 points)

1.4 A large consumer goods company ran a television advertisement for one of its soap products. On the basis of a survey that was conducted, probabilities were assigned to the following events. (20 points in total)

B = individual purchased the product

S = individual recalls seeing the advertisement

B ⋂ S = individual purchased the product and recalls seeing the advertisement

The probabilities assigned were P(B) = .20, P(S) = .40, and P(B ⋂ S) = .12.

a. What is the probability of an individual’s purchasing the product given that the individual recalls seeing the advertisement? Does seeing the advertisement increase the probability that the individual will purchase the product? As a decision maker, would you recommend continuing the advertisement (assuming that the cost is reasonable)? (10 points)

b. Assume that individuals who do not purchase the company’s soap product buy from its competitors. What would be your estimate of the company’s market share? Would you expect that continuing the advertisement will increase the company’s market share? Why or why not? (3 points)

c. The company also tested another advertisement and assigned it values of P(S) = .30 and P(B ⋂ S) = .10. What is P(B | S) for this other advertisement? Which advertisement seems to have had the bigger effect on customer purchases? (7 points)

1. **Chapter 14 questions - simple linear regression (40 points in total)**

The Dow Jones Industrial Average (DJIA) and the Standard & Poor’s 500 (S&P 500) indexes are used as measures of overall movement in the stock market. The DJIA is based on the price movements of 30 large companies; the S&P 500 is an index composed of 500 stocks. Some say the S&P 500 is a better measure of stock market performance because it is broader based. The closing prices for the DJIA and the S&P 500 for 15 weeks, beginning with January 6, 2012, are given in the accompanying Excel dataset **DJIASP500.xlsx** (Barron’s website, April 17, 2012).

2.1 Develop and show a scatter plot with DJIA as the independent variable (i.e., the horizontal axis) in the following space. According to the graph, do DJIA and S&P have a linear relationship? If yes, is it a positive or negative linear relationship, and why? (10 points)

2.2 Develop and show the estimated regression equation. In addition, interpret the meaning of the estimated β1 (i.e., the slope b1) in the equation by considering increasing DJIA (the x variable) by one unit. (Hint: you may run the linear regression in Excel using the Data Analysis plugin under the Data menu in Excel to generate the regression report, then you can develop the equation based on the estimated coefficients shown in the report.) (15 points)

2.3 Test for a significant linear relationship for the overall regression model. Use α = 0.05 (i.e., the 5% significance level), and explain whether the model is significant at the 5% significance level. (Hint: you may refer to the appropriate number in the regression report to see if the model is significant.) (5 points)

2.4 Did the estimated regression equation provide a good fit (i.e., whether the estimated equation explained/captured most of the linear relationship in the sample dataset)? Explain. (Hint: you may refer to the appropriate number in the regression report to see if the estimated regression equation provided a good fit.) (5 points)

2.5 Suppose that the closing price for the DJIA is 13,500. Predict the closing price for the S&P 500 using the estimated regression equation. Should we be concerned that the DJIA value of 13,500 used to predict the S&P 500 value? Why or why not? (Hint: consider the extrapolation situation, the , and a new given x value that is not far beyond the valid x range in the original dataset.) (5 points)