



Strathmore
UNIVERSITY

STRATHMORE UNIVERSITY BUSINESS SCHOOL
MASTER OF MANAGEMENT IN AGRIBUSINESS

END OF SEMESTER EXAM

MMA 8104: QUANTITATIVE ANALYSIS IN AGRIBUSINESS

Date: Friday 14th July 2023

Time: 3 hours

Instructions

1. This Exam consists of **SIX** Questions
2. Answer **Question 1 compulsory and any other 4** Questions

Question 1 (20 Marks)

The Ovacados from a grower's orchard have a mean weight of 16 ounces. The ovacado weight is normally distributed with mean = 16 with a standard deviation, $s=4$. A local television station that runs a consumer advocacy program reported that an ovacado from this grower was selected and weighed only 14 ounces. The reporter said she thought it should have been heavier if the mean weight is supposed to be 16 ounces. The grower, when interviewed, said that he thought the probability was quite high that a ovacado would weigh 14 or more ounces. By using **NORM.DIST** or otherwise, show how to check his statement. **(4 marks)**

- a) Japolli Bakery tracks sales of its different bread products on a daily basis. The data for 22 consecutive days at one of its retail outlets in Nashville are in a file called **Japolli Bakery**. Calculate the measures of central tendency, dispersion and of shape for the sales for each of the bread categories and write a short report that describes the data. **(6 marks)**
- b) Christiansen Accounting prepares tax returns for individuals and companies. Over the years, the firm has tracked its clients and has discovered that 12% of the individual returns have been selected for audit by the Internal Revenue Service. On one particular day, the firm signed two new individual tax clients. The firm is interested in the probability that at least one of these clients will be audited. **(10 Marks)**

Question 2 (10 marks)

The *Consumer Expenditures* report released by the U.S. Bureau of Labor Statistics found the average annual household spending on food at home in 2014 was \$3,971. Suppose a random sample of 137 households in Detroit was taken to determine whether the average annual expenditure on food at home was less for consumer units in Detroit than in the nation as a whole. The sample results are in the file **Detroit Eats**. Based on the sample results, can it be concluded at the $\alpha =$

0.01 and 0.05 level of significance that average consumer-unit spending for food at home in Detroit is less than the national average?

Question 3 (10 marks)

The investment firm Foresight Investments wants to manage the pension fund of a major Chicago retailer. For their presentation to the retailer, the Foresight analysts want to use simple linear regression to model the relationship between profits and numbers of employees for 50 companies in the firm's portfolio. The data for the analysis are in the file **Employees**.

- a) Develop a scatter plot to graphically display the relationship between the independent and dependent variables
- b) Calculate the correlation coefficient and write down the linear regression equation.

Question 4 (10 marks)

A November 13, 2015, report titled "The cost of hiring a new employee" by Annie Mueller (www.investopedia.com) indicated that the average cost for an American company to fill a job vacancy was \$3,500. Sample data showing costs to hire employees are in a file titled **Hired**.

- a) Produce a relative frequency histogram for these data. Does it seem plausible the data were sampled from a normally distributed population?
- b) Calculate the mean and standard deviation of the cost of filling a job vacancy.
- c) Determine the probability that the cost of filling a job vacancy would be between \$2,000 and \$3,000.

Question 5 (10 marks)

The file **Danish Coffee** contains data on individual coffee consumption (in kg) for 144 randomly selected Danish coffee drinkers.

- a) Construct a histogram of the coffee consumption data.
- b) Briefly comment on what the histogram reveals concerning the data.
- c) Develop a relative frequency distribution table and a cumulative relative frequency distribution of the coffee data.
- d) What percentage of the coffee drinkers sampled consume 8.0 kg or more annually?

Question 6 (10 marks)

The file **Danish Coffee** contains a random sample of 144 Danish coffee drinkers and measures the annual coffee consumption in kilograms for each sampled coffee drinker. A marketing research firm wants to use this information to develop an advertising campaign to increase Danish coffee consumption.

- a) Based on the sample's results, what is the best point estimate of average annual coffee consumption for Danish coffee drinkers?
- b) Develop and interpret a 90%, 95% and 99% confidence interval estimate for the mean annual coffee consumption of Danish coffee drinkers.