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Solutions Manual

to accompany

Australasian Business Statistics 4th Edition

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Chapter 1

Introduction to statistics

SOLUTIONS TO PROBLEMS IN CHAPTER 1

- 1.1 Give a specific example of data that might be gathered from each of the following business disciplines: finance, human resources, marketing, production and management. An example in the marketing area might be ‘the number of sales per month by each salesperson’.**

Example in Finance: data on Price/Earnings Ratio can be very useful to financial investors since it facilitates them in fair market evaluation of stocks.

Example in Human Resources: A HR or organisational manager might be interested to collect data on staff turnover as high employee’s turnover ratio can reduce the company’s efficiency.

Example in Marketing: Marketers may be interested in existing or potential customers’ addresses and purchase history in order to promote a service or product.

Example in Production: a CEO or a manager of a manufacturing organisation is interested in information about the cost of production to ensure the product meets its cost target.

Example in Management: a manager might be interested in operational information (such as cost, revenue, efficiency, etc.) of the firm in order to establish strategic goals.

- 1.2 For each of the following companies, give examples of data that could be gathered and what purpose the data would serve: Bluescope Steel, AAMI, Jetstar, IKEA, Telstra, ANZ Bank, Sydney City Council, and Black and White Taxis.**

Bluescope Steel: collecting data on international steel prices, current international competitors, and new potential industry clients so they can set their operational and production goals and strategies

AAMI: data on the insurance products prices and the type of products offered by AAMI’s competitors to set price and marketing strategies.

Jetstar: Data on travelling passenger’s characteristics and jobs so more tailored flights/routes can be arranged.

IKEA: data on wholesale suppliers that can offer cheaper products to IKEA so IKEA would be able to maintain low price strategy.

Telstra: monitoring data on complaints received by the call centre on daily basis to measure customer satisfaction.

ANZ bank: customer survey data on internet banking to improve their online banking services.

Sydney City Council: Data on infrastructure or transport to manage resources in optimum way.

Black and White Taxis: data on peak hours and week days to ensure enough shifts and taxis are made available to customers.

1.3 Give an example of descriptive statistics in the recording industry. Give an example of how inferential statistics could be used in the recording industry.

- (1) ARIA total sales of CDs this week, number of artists under contract to a record company at a given time.
- (2) total dollars spent on advertising last month to promote an album.
- (3) number of units produced in a day.
- (4) number of retail outlets selling the company's products.

Inferential statistics in recorded music industry:

- (1) measurement of the amount spent per month on recorded music for a few consumers then use that figure to infer the amount spent for the population.
- (2) determination of market share for rap music by randomly selecting a sample of 500 purchasers of recorded music.
- (3) determination of top ten single records by sampling the number of requests at a few radio stations.
- (4) estimation of the average length of a single recording by taking a sample of records and measuring them.

The difference between descriptive and inferential statistics lies mainly in the coverage of the data. These descriptive examples all gather data from every item in the population about which the description is being made. For example, Sony BMG measures the sales on *all* its compact discs for a week and reports the total.

In each of the inferential statistics examples, a *sample* of the population is taken and the population value is estimated or inferred from the sample. For example, it may be practically impossible to determine the proportion of buyers who prefer rap music. However, a random sample of buyers can be contacted and interviewed for music preference. Population market share can be inferred from the results. The results can be inferred to population market share.

1.4 Suppose you are an operations manager for a plant that manufactures batteries. Give an example of how you could use *descriptive* statistics to make better managerial decisions. Give an example of how you could use *inferential* statistics to make better managerial decisions.

- (1) total number of worker hours per plant per week — helps management understand labour costs, work allocation, productivity, etc.
- (2) company sales volume of batteries in a year — helps management decide if the product is profitable, how much to advertise in coming year, compare to costs to determine profitability.
- (3) total amount of sulphuric acid purchased per month for use in battery production — can be used by management to study wasted inventory, scrap, etc.

Inferential Statistics:

- (1) take a sample of batteries and test them to determine the average shelf-life — use the sample average to reach conclusions about all batteries of this type. Management can then make labelling and advertising claims. They can compare these figures to the shelf-life of competing batteries.
- (2) Take a sample of battery consumers and determine how many batteries they purchase per year. Make inference for the entire population — management can use this information to estimate market potential and penetration.
- (3) Interview a random sample of production workers to determine attitude towards company management — management can use the survey results to ascertain employee morale and to direct efforts towards creating a more positive working environment which, hopefully, results in greater productivity.

1.5 Classify each of the following as nominal, ordinal, discrete or continuous data.

a. The RBA interest rate :

Continuous

b. The return from government bonds :

Continuous

c. The customer satisfaction ranking in a survey of a telecommunications

company:

Ordinal

d. The ASX 200 index

Continuous

e. The number of tourists arriving in Australia each month

Discrete

f. The airline a tourist flies by into Australia

Discrete

g. The time to serve a customer in a bank queue

Continues

1.6 Classify each of the following as nominal, ordinal, discrete or continuous data.

a. The ranking of a company on BRW's top 1000 list

b. The number of tickets sold at a cinema on any given night

c. The identification number on a questionnaire

d. Per capita income

e. The trade balance in dollars

f. Socioeconomic class (low, middle, upper)

g. Profit/loss in dollars

h. A company's ABN

i. Standard & Poor's credit ratings of countries based on the following scale

Rating	Grade
Highest quality	AAA
High quality	AA
Upper medium quality	A
Medium quality	BBB
Somewhat speculative	BB
Low quality, speculative	B
Low grade, default possible	CCC
Low grade, partial recovery possible	CC
Default, recovery unlikely	C

(a) ordinal

(b) discrete, but treated as continuous for analysis

(c) nominal

(d) continuous

(e) discrete, but treated as continuous for analysis

- (f) ordinal
- (g) discrete, but treated as continuous for analysis
- (h) nominal
- (i) ordinal

1.7 Powerkontrol Australia designs and manufactures power distribution switchboards and control centres for hospitals, bridges, airports, tunnels, highways and water treatment plants. Powerkontrol's director of marketing wants to determine client satisfaction with its products and services. He developed a questionnaire that yields a satisfaction score between 10 and 50 for participant responses. A random sample of 35 of the company's 900 clients is asked to complete a satisfaction survey. The satisfaction scores for the 35 participants are averaged to produce a mean satisfaction score.

- a. What is the population for this study?**
- b. What is the sample for this study?**
- c. What is the statistic for this study?**
- d. What would be a parameter for this study?**

- (a) The population for this study is the 900 clients of Powerkontrol Australia.
- (b) The sample is the randomly chosen group of 35 clients.
- (c) The statistic is the average satisfaction score for the sample of 35 clients.
- (d) The parameter is the average satisfaction score for all 900 clients of Powerkontrol Australia in the population.

1.8 Cricket Australia wants to run a marketing campaign to increase attendance at test matches. You have been hired as a consultant to conduct a survey and prepare a report on your findings.

- a. What variables do you consider affect a person's interest in cricket test matches?**
- b. Design a questionnaire of 10 to 15 questions that will enable you to decide which section of the population the marketing campaign should target.**

- (a) The variables affecting a person's interest in cricket test matches include: playing teams, significance of test match, ticket price, etc.
- (b) What is your age?
What is your gender?
What is your employment status: fulltime, part-time, unemployed, student?
On how many days in the last 12 months did you attend test cricket matches?
On how many days do you plan to attend test matches in the next 12 months?

What do you consider to be a reasonable price for a ticket?

How much are you willing to spend on food and beverages at the stadium?

What kind of additional entertainment would you like to see in future test matches?

How would you travel to the match? Tick all that apply: car, bus, train, other.

Did you experience any transport problems in the past when attending test matches? If so, please specify.

Is there anything in particular that would attract you to future test matches?