

2.3 Exercises, page 99

- cluster random sampling
 - simple random sampling
 - systematic random sampling
 - multi-stage random sampling
 - stratified random sampling
- Cluster: Arrange the class in groups of three and randomly select two groups. Stratified: Divide the class into females and males and randomly select 3 students of each gender. Systematic: Randomly pick the first student, then pick every fourth student until you have selected six.
- Quick and easy, but the sample may not end up representative of the population by chance.
 - Straight forward, but the sample may not end up representative of the population by chance.
 - Each stratum is represented, but the sample may not end up representative of the population by chance.
 - All members of the chosen groups are represented, but not all groups are represented.
 - Higher chance of representation of each group than simple random sampling, but the sample may not end up representative of the population by chance.
- Answers may vary; for example:
 - 30, 76, 157, 410, 19, 394
 - 3, 44, 85, 126, 167, 208, 249, 290, 331, 372
 - 5, 34, 89, 122, 156, 199, 222, 267, 290, 322, 333, 389
 - 202, 213, 229, 233, 244, 256, 278, 281, 290, 295
- simple
 - cluster
 - systematic
 - multi-stage
 - stratified
- (c) Make the males and females into strata and perform a stratified random sample.
- In stratified random sampling, the population is divided into groups (strata) and a representative simple random sample is taken from each stratum, while a systematic random sample takes every n th individual in the population, where n is the sampling interval. $n = \frac{\text{population size}}{\text{sample size}}$. For example: Sample 5 students from a class of 24. There are 15 males. Stratified: Divide the class into 9 females and 15 males. Take two random females and three random males. Systematic: Arrange the students in alphabetical order and take every fourth student.
- Choose a random number of classes, then choose a random number of students from each of these classes.
- Answers may vary; for example:
 - Shuffle the cards and select the first 13 cards in the deck.
 - Shuffle the cards and select every fourth card.
 - Separate the cards into 4 piles by suit. Randomly pick one suit. Take top 3 cards from each pile and one other card.
 - Separate the cards into 4 suits. Randomly pick one suit.
 - Separate the cards into 2 piles of the same colour in each pile. Randomly select 13 cards from one pile.
- Answers may vary; for example:
 - B774, X315, X322, P035, L506, L501, P032, X320, B777, P039, B771, L507
 - L503, L506, X315, X318, X321, B772, B775, B778, P034, P037
 - L504, L503, L501, X316, X318, X315, B771, B774, B773, P032, P033, P034
- No, because not every model would be represented.
- simple random sampling
 - stratified random sampling
 - systematic random sampling or simple random sampling

- multi-stage random sampling
- stratified random sampling

- Quota sampling: Set the number of women, men, high income, medium income, and low income from each state or region. This is not random.
- The longer the sample is, the more representative of the population it becomes.

2.4 Exercises, page 105

- What do you think of the quantity of homework assigned so far in the course?
 - Describe your degree of preference to the type of music listed below.
 - What are your plans for post-secondary school?
 - What is your favourite type (genre) of television program?
 - How confident are you in your swimming ability?
 - Answers may vary; for example: What do you think about the quantity of homework assigned so far in this course?
A) too much B) appropriate C) not enough D) no opinion
 - Rank the following types of music in order of preference (1 means hate; 5 means love).
 - After high school, I plan to attend: A) college B) university C) apprenticeship D) other
 - My favourite type (genre) of television show is A) comedy B) real-life C) science fiction D) educational E) news F) other
 - How confident are you in your swimming ability? A) very B) somewhat C) a little D) not at all E) no opinion
 - What do you think of your timetabled courses this semester? Check all that apply. ☐ interesting ☐ challenging ☐ useful
 - Student council will attempt to have the following activities. Rank them from 1 for most important to 5 for least important.
 ____ more dances ____ more lunch time sports
 ____ more music before school ____ more assemblies
 ____ more university tours
 - Rate the television programs on this list from 1 to 5 (1 meaning very satisfied and 5 meaning not very satisfied).
- | | (i) (a) | (ii) (a) | (iii) (c) | (iv) (c) | | |
|----------------------|---------|----------|-----------|----------|-----|-----|
| 5. Criterion | (a) | (b) | (c) | (d) | (e) | (f) |
| Simple | N | Y | Y | N | Y | Y |
| Specific | Y | Y | Y | Y | Y | Y |
| Readable | N | Y | Y | Y | Y | Y |
| Avoids jargon | Y | Y | Y | N | N | N |
| Avoids abbreviations | Y | Y | N | Y | Y | Y |
| Avoids negatives | Y | Y | Y | Y | Y | N |
| Avoids being leading | Y | Y | Y | N | N | Y |
| Avoids insensitivity | Y | Y | Y | N | N | Y |
- List adjectives that describe the state of the environment. What is the extent of pollution in Ontario?
 - Should the Ontario Municipal Board be funded to initiate waste audits across the province? Yes No
 - Should mining companies be forced to decrease the amount of sulfur dioxide being emitted at smelters? Please comment.
 - On a 5-point scale, do you agree that all corporations should pay higher taxes?
 - Should forestry companies be able to cut down all trees in certain areas? Explain.
- Open questions allow a wide degree of possibilities, which might be difficult to interpret. Closed questions are easy to analyze, but the options may bias the results.

7. (i) (a) Information where there is only a limited number of answers
(b) More than one answer or ranking or unlimited number of choices
(ii) (a) Stating preference of each choice in the list
(b) Specific questions with only one answer
(iii) (a) Information with more than one answer
(b) Ranking or answers that are not given
(iv) (a) Evaluating something or expressing an opinion about it
(b) Ranking, more than one answer, information other than a rating
8. (a) open, information (b) open, information
(c) open (d) closed, ranking
(e) open, information (f) closed, checklist
(g) open, ranking
10. (a) Rate the quality of cafeteria food at your school with a number from 1 to 5 (1 means horrible, 5 means great).
(b) Rank the following musical styles from most favourite (1) to least favourite (6): __ alternative __ folk __ hip hop __ pop __ jazz __ rock
(c) Check the activities that you would like to see offered at a school fundraiser. ☐ lucky draw ☐ drama ☐ singing contest ☐ magic show
12. (a) closed, information (b) open
(c) closed, ranking (d) closed, information
(e) open (f) closed, information
- (c) Information on sharks but not related to hockey
(d) Sites in the .ca domain with words like Canada, Canadian, etc.
(e) Information on hot dogs or ketchup or mustard
(f) Sites about Slim Whitman or Slim Witman
2. (a) A Web directory is a commercial service that provides keyword searches that link to sites. A search engine is a Web site that performs searches of the whole Internet.
(b) (i) Web directory
(ii) search engine
(iii) search engine
(iv) Web directory
3. (a) (Sale | Sell) & "CD burners"
(b) Stat* & software
(c) Literature +domain:ca
(d) "Your school" +domain:ca
(e) education +site:gov.on.ca
(f) download + "independent recording artist" +domain:ca
4. (a) "Ralph Waldo Emerson" +quotes
(b) "Mount Logan" +(altitude OR height)
(c) RCMP +history
(d) "Emily Carr" +site:canoe.ca
5. (a) "New York City" +theater
(b) Kosovo +refugees
(c) music -classical
(d) ("Toronto Blue Jays") +("Montreal Expos") +player +stat*
(e) mathematician +canad*
(f) drug* +illicit -heroin -cocaine

2.5 Exercises, page 113

1. (a) non-response (b) sampling
(c) response (d) sampling
2. (a), (b), and (c)
3. (a) and (c)
4. Response bias. Have the company name blocked from Call Display. (Could also be considered non-response bias)
5. Which store did you visit? How much money did you spend?
6. Make each question have the option of being open. Provide a space for other: __
9. Non-response: The alumnus may not reply. Household: Since only 60% of associations provided lists, there might be misrepresentation.
10. (a) non-response, household
11. (a) (i) Response bias. Information about rising youth crime should not be given.
(ii) What do you feel should be the top enforcement priority for the local police force?
(b) (i) Response bias. Baseball, fastball, softball, and two-pitch are almost the same, so are ice hockey, shinny, and ball hockey.
(ii) Rank the following: __ baseball __ hockey __ cricket __ basketball __ lacrosse
(c) (i) Response bias. Scrumptious is larger than Bland; use of bold text
(ii) You should have ordered Scrumptious Really Good Decent Bland (same font size)
12. The entire questionnaire generates a response bias and should be rewritten (except Question 1).

2.6 Exercises, page 123

1. (a) Sites about Thomas Engine trains
(b) Information on Gandalf found on members.tripod.com Web sites

2.7 Exercises, page 130

1. (a) spreadsheet (b) database (c) spreadsheet
(d) database (e) spreadsheet (f) table
2. Bolt width (mm), Frequency: 35–39.9, 2; 40–44.9, 4; 45–49.9, 6; 50–54.9, 7; 55–59.9, 7, 60–64.9, 6
4. 1950: 2.6, 1955: 2.8, 1960: 3.0, 1965: 3.4, 1970: 3.8, 1975: 4.1, 1980: 4.5, 1985: 4.9, 1990: 5.3, 1995: 5.8, 2000: 6.1, 2005: 6.5, 2010: 6.8, 2015: 7.2, 2020: 7.6, 2025: 7.8, 2030: 8.2, 2035: 8.5, 2040: 8.8, 2045: 8.9, 2050: 9.1
5. (a) Graph (iv) (b) Graph (vi) (c) Graph (v)
(d) Graph (ii) (e) Graph (iii) (f) Graph (i)
6. (155, 52), (175, 67), (185, 72), (195, 77), (205, 79), (215, 83)
7. (b) mean for $x = 13.4$; mean for $y = 7.1$; median for $x = 13.6$; median for $y = 7.1$
13. (a), (b) Sol High Low Average
1 -29.10°C -85.40°C -60.64°C
2 -26.86°C -85.84°C -59.34°C
3 -28.02°C -85.38°C -61.55°C
14. (a), (b) Sol High Low Average
1 248°K 185°K 216.5°K
2 248°K 184°K 216°K
3 249°K 185°K 217°K
4 248°K 185°K 216.5°K
5 249°K 186°K 217.5°K
15. (a), (b) Sol High Low Average
1 6.99 mb 6.68 mb 6.835 mb
2 6.96 mb 6.77 mb 6.865 mb
3 6.97 mb 6.77 mb 6.87 mb
4 6.96 mb 6.77 mb 6.865 mb
5 6.96 mb 6.68 mb 6.82 mb
average = $\frac{\text{high} + \text{low}}{2}$