

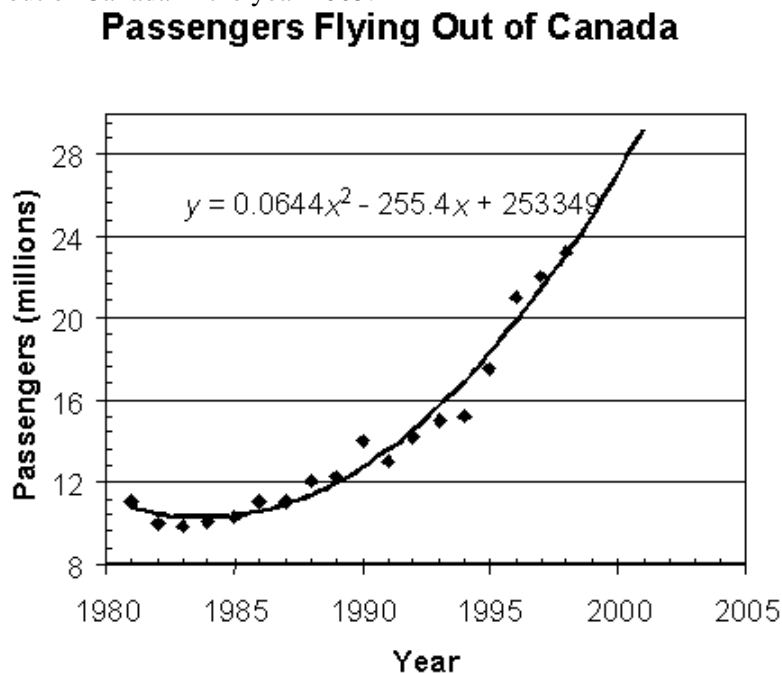
Ch. 1_Ch. 2 Sample Exam Questions

Short Answer

1. A survey of students living in a high-rise residence is to be conducted. The residence has 10 floors, 20 rooms per floor, and 2 people per room. Two floors are randomly selected, and then both of the residents of five randomly chosen rooms on each of the floors are surveyed. What two sampling methods are being used?
2. A researcher is interested in how new training techniques will change track and field. The researcher takes a sample of athletes from all sports, using all training methods, and measures how their performance changes for the next 4 years. Is this an example of a cross-sectional or longitudinal study?
3. A doctor wants to determine how diet affects the development of stomach ulcers. He has a sample of his patients, who have just been diagnosed with ulcers, fill out a questionnaire about the foods they ate over the past year. Is this a longitudinal or cross-sectional study?
4. What type of bias exists in the following scenario? A survey of local businesses who advertise in the Yellow Pages is to be conducted. In the Yellow Pages, businesses are organized by the type of service they offer. The types of service are organized alphabetically. The first 100 businesses listed in the Yellow Pages are selected to participate in the survey.
5. Identify the type of bias that exists in the following data-collection method. The environmental group Greenpeace asks people what they think are the most important issues that must be faced by the government.
6. Why would the following question on a survey lead to response bias?

Disposable diapers account for less than 2% of material in our landfills, but junk mail accounts for more than 5%. Some people have suggested that disposable diapers should be banned. Would you be in favour of such a ban?

7. Use the quadratic regression given in the following scatter plot to estimate the number of passengers flying out of Canada in the year 2005.



Problem

8. Large polling organizations typically interview a random sample of 1200 to 1500 Canadians when conducting political polls. Explain why the number of people interviewed is often doubled just before a federal election.
9. A nutritionist promoting healthy eating practices wants to conduct a survey. The survey is to determine the average amount of fat consumed per day by adults in a city. Because members of any one family eat mostly the same meals, she will only interview at most one adult per household and wants to survey 1000 people. She has no list of the individual people in the city, but she has a map showing the housing for each block in detail. Identify the population, the sample, the variables to be measured, and the most appropriate sampling method.
10. A secondary school has recently implemented a new curriculum for grade 10 math. A teacher wishes to study whether the distribution of marks is different for students in her school taking grade 10 math under the new curriculum than for students who took grade 10 math under the old curriculum. Identify the variables of interest and classify them as qualitative or quantitative. Should the data come from primary or secondary sources?
11. A pollster reports that 62% of Canadians approve of the prime minister's treatment of a scandal involving one of his cabinet ministers. This result was based on a poll of 1200 Canadians. Participants were selected from each province, with the number from each province representative of the province's population. No participants were selected from the territories. What is the variable measured? Is it qualitative or quantitative? What is the population of interest? What type of sampling method was used? Do you think the result suffers from bias? Why or why not?
12. A survey of households in a town collects the following information from the eldest adult in the household.
 - a) marital status
 - b) occupation
 - c) number of children living at home
 - d) annual household incomeClassify each of the variables as qualitative or quantitative and, if appropriate, continuous or discrete.
14. Archeologists often rely on relationships between body measurements when they analyze ancient human fossils. The following table shows the measurements of the femur (thigh bone) and overall height of 50 adults.

Relationship of Human Femur Length to Human Height (cm)			
Femur	Height	Femur	Height
38	149	50	184
46	169	41	171
38	152	47	187
38	147	42	162
44	190	42	168
48	191	39	151
46	190	43	169

39	152	38	143
39	152	29	104
40	171	34	138
44	185	50	204
39	157	51	215
39	155	40	150
31	126	40	163
41	166	47	198
30	117	40	153
36	151	46	188
41	170	33	122
38	161	36	128
35	146	34	145
32	129	31	127
31	126	37	148
44	184	43	163
37	167	45	164
45	175	39	154

- a) Create a scatter plot to display these data.
 - b) Determine the correlation coefficient. How strong is the correlation?
 - c) According to this line of best fit, how tall would a person be with a 38-cm long femur?
15. A questionnaire about social pressures facing teens included the following questions.
- a) *Do you feel pressure from your peers to use alcohol?*
Often Sometimes Rarely Never

b) *What are the top five peer pressures you feel that teens face?*

Why does bias exist in these questions and how can it be removed?

Ch. 1 & Ch. 2 Sample Exam Questions Answer Section

SHORT ANSWER

1. ANS:
The two sampling methods being used are multi-stage and cluster random sampling.
2. ANS:
This is an example of a longitudinal study.
3. ANS:
This is a cross-sectional study.
4. ANS:
Household bias exists in this scenario because businesses with services near the beginning of the alphabet will be over-represented in the survey.
5. ANS:
The type of bias in this data-collection method is response bias.
6. ANS:
The question leads to response bias because it influences the respondent by emphasizing that diapers occupy less of the material in landfills than does junk mail.
7. ANS:
There will be about 162 million passengers flying out of Canada in 2005.

PROBLEM

8. ANS:
The larger the sample size, the more precise are the estimates resulting from the survey. Just before an election, the polling organizations want to be able to give the estimates of the percent of Canadians who will vote for each party with greater precision.
9. ANS:
The population is all adults in the city. The sample is the 1000 people who are surveyed. The variable to be measured is the amount of fat consumed per day by each person in the sample. This will likely not be measured directly, but by calculating fat content from a list of all foods and their quantities consumed by the participants. The nutritionist should use multi-stage sampling. She needs to first take a sample of 1000 households. Then from each, she should take a sample of one adult. This is necessary because she has no list of individuals. It may be more convenient to use cluster sampling for the choice of households where the clusters are blocks. It would be quicker and cheaper to interview someone from every household on a block. A simple random sample might mean she would have to interview people from households scattered across the city.

10. ANS:

One variable is whether or not a student studied under the new or old curriculum, which is qualitative. The other variable is a student's mark in grade 10 math, which is quantitative. Since the teacher can collect the data directly from students in her school, she should collect it from a primary source.

11. ANS:

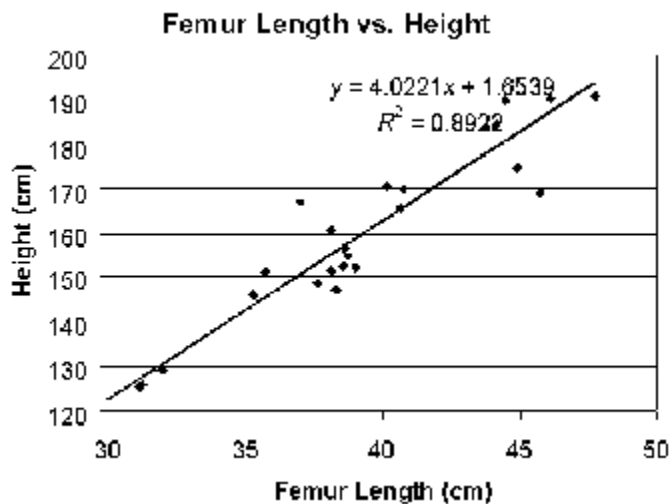
The variable measured is whether or not each person approves of the prime minister's actions. It is a qualitative variable. The population of interest is all Canadians, presumably just those of voting age. Stratified random sampling was used. Since the territories include such a small percentage of the Canadian population, the result is not likely to be biased despite their exclusion.

12. ANS:

- a) Marital status is qualitative.
- b) Occupation is qualitative.
- c) Number of children living at home is quantitative and discrete.
- d) Annual household income is quantitative and continuous.

13. ANS:

a)



b) $r = \sqrt{0.8922}$

$r \approx 0.945$

This indicates a strong positive correlation.

c) $y = 4.022(38) + 1.6539$

$y \approx 154.5$

A person with a femur length of 38 cm would have a height of 154.5 cm.

14. ANS:

Bias exists because question a) suggests an answer for question b). The bias can be removed by asking question b) first.