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Chapter 5: Data Visualization, Sampling Techniques, Bias in Surveys

1. Would you choose a histogram or a bar graph with separated bars for the data listed below?
 - a) the numbers from 100 rolls of a standard die
 - b) the distances 40 athletes throw a shot-put
 - c) the ages of all players in a junior lacrosse league
 - d) the heights of all players in a junior lacrosse league
2. The speeds of 24 motorists ticketed for exceeding a 60-km/h limit are listed below.

75	72	66	80	75	70	71	82	69	70	72	78
90	75	76	80	75	96	91	77	76	84	74	79

- a) Construct a frequency table for these data.
- b) Construct a frequency histogram and frequency polygon.
- c) Construct a cumulative-frequency diagram.
- d) How many of the motorists exceeded the speed limit by 15 km/h or less?
- e) How many exceeded the speed limit by over 20 km/h?

3. The list below shows the value of purchases, in dollars, by 30 customers at a clothing store.

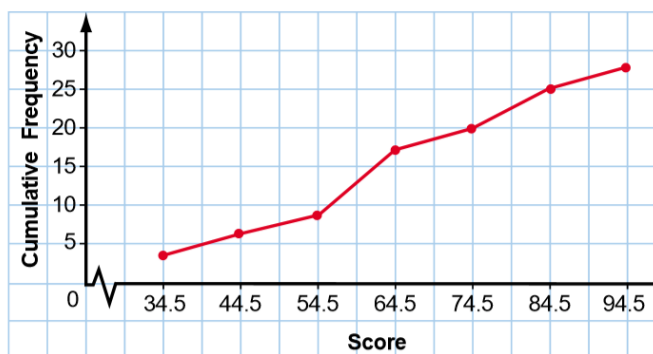
55.40	48.26	28.31	14.12	88.90	34.45
51.02	71.87	105.12	10.19	74.44	29.05
43.56	90.66	23.00	60.52	43.17	28.49
67.03	16.18	76.05	45.68	22.76	36.73
39.92	112.48	81.21	56.73	47.19	34.45

- a) Would you present these data in a grouped or ungrouped format?
- b) Create a frequency table.
- c) Create a relative-frequency and a cumulative-relative-frequency polygon.

4. What is the sum of all the relative frequencies for any set of data? Explain why this sum occurs.

5. This cumulative-frequency diagram shows the distribution of the examination scores for a biology class.

a) What interval contains the greatest number of scores?
Explain how you can tell.



b) How many scores fall within this interval?

6. Classify the sampling method used in each of the following scenarios.

- a) A radio-show host invites listeners to call in with their views on banning smoking in restaurants.
- b) The Heritage Ministry selects a sample of recent immigrants such that the proportions from each country of origin are the same as for all immigrants last year.
- c) A reporter stops people on a downtown street to ask what they think of the city's lakefront.
- d) A school guidance counsellor arranges interviews with every fifth student on the alphabetized attendance roster.
- e) The province randomly chooses 25 public schools to conduct a survey about cyberbullying.

7. There are about 1564 students at Riverview High school.

- a) Describe how would design a systematic sample of 20 from these students.
- b) Suppose there are 386 students in Grade 9, 420 students in Grade 10, 390 students in Grade 11 and 368 students in Grade 12. Describe how would design a stratified sample of 40 students.

8. A community centre chooses 15 of its members at random and asks them to have each member of their families complete a short questionnaire.
 - a) What type of sample is the community centre using?
 - b) Are the 15 community-centre members and their families a simple random sample of the community? Explain.

9. Classify the bias in each of the following scenarios.
 - a) Members of a golf and country club are polled regarding the construction of a highway interchange on part of their golf course.
 - b) A group of city councillors are asked whether they have ever taken part in an illegal protest.
 - c) A random poll asks the following question: "The proposed casino will produce a number of jobs and economic activity in and around your city, and it will also generate revenue for the provincial government. Are you in favour of this forward-thinking initiative?"
 - d) A survey uses a cluster sample of Toronto residents to determine public opinion on whether the provincial government should increase funding for the public transit.

10. A talk-show host conducts an on-air survey about re-instituting capital punishment in Canada. Six out of ten callers voice their support for capital punishment. The next day, the host claims that 60% of Canadians are in favour of capital punishment. Is this claim statistically valid? Explain your reasoning.