

## 3.1 Sampling Techniques

### A Statistics

- ✓ Statistics is the gathering, organization, analysis, and presentation of numerical information.
- ✓ You can apply statistical methods to almost any kind of data.
- ✓ Researchers, advertisers, professors, and sports announcers all make use of statistics.

### B Population and Samples

In Statistics the term “population” has a slightly different meaning from the one given to it in ordinary speech.

**Population** – a complete collection of measurements, objects, or individuals under study.

Examples:

- ✓ all high school students of Ontario
- ✓ all teachers in public system in Canada
- ✓ all Canadians
- ✓ all coyotes in North America
- ✓ all cars in Canada

**Sample** - a portion or subset taken from population that are representative of the population

Examples:

- ✓ high school students taking the MBF3C course at Glenforest SS
- ✓ Math teachers at Glenforest SS
- ✓ people living at 2156 Hurontario Street apartment building
- ✓ coyotes living at Britannia Farm, Mississauga
- ✓ cars on the parking lot at Square One, Mississauga

In Statistics, samples are used in studies because they require less:

- ✓ money
- ✓ time
- ✓ resources

### C Sampling

Sampling is the procedure (technique) in which a sample is selected from a population for research purpose.

#### a) Simple Random Sample

- ✓ Each member of the population has an equal chance to be selected.

Example. A sample 25 employees are chosen out of a hat from a company of 250 employees.

#### b) Stratified Random Sample

- ✓ Population is divided in subgroups and a random sample is selected from each group

Example. Your population is all graduates of the Waterloo University within the last ten years. You will stratify by both gender (male, female) and degree received (Bachelor, Master, or PHD).

#### c) Voluntary Response Sample

- ✓ Each member of the population has an equal chance to be selected.

Example. People voting in American Idol show.

d) **Cluster Sample**

- ✓ Population is divided in clusters and a number of clusters are chosen.

Example. Choosing a few high schools to be part of a study instead of all schools of a school board.

e) **Convenience Sample**

- ✓ Sample contains those members from which data are most easily collected.

Example. A survey done with all you friends.

f) **Systematic Sample**

- ✓ Every n-th member of the population is selected.

Example. Every 100-th voter at a polling station is selected for the exit poll.

Example 1. What type(s) of sample would be appropriate for

- a) a survey of engineers, technicians, and managers employed by a company?

stratified random sample

- b) determining the most popular pizza topping?

voluntary response sample

- c) measuring customer satisfaction for a department store?

many answers are possible → convenience sample  
→ systematic sample  
→ voluntary

Example 2. 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.

voluntary response

- 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.

stratified by country of origin

- c) A reporter stops people on a downtown street to ask what they think of the city's lakefront.

voluntary

- d) A school guidance counsellor arranges interviews with every fifth student on the alphabetized attendance roster.

systematic

- e) A statistician conducting a survey randomly selects 20 cities from across Canada, then 5 neighbourhoods from each of the cities, and then 3 households from each of the neighbourhoods.

cluster sample (cities)

- f) The province randomly chooses 25 public schools to participate in a new fundraising initiative.

cluster random sample

Reading Pages 102-106

Homework Pages 106-109 # 3, 4