1.4 Problems (last update 27 August 2024)

1. Give one possible sample of size 3 from each of the following populations. In other words, list 3 of the units that constitute the population described.

a) All the large cities in the United States;

b) All the cities in Louisiana;

c) All TV or movie streaming services;

d) All companies listed on the New York Stock Exchange.

2. Identify the unit on which each of the following variables is measured. For example, for the variable "the age of a person", a person is a unit since this variable is a characteristic of the person.

a) The number of people in a household;

b) The size of the screen of a laptop computer (measured in inches);

c) The number of credit hours a student is registered for;

d) The manufacturer of an automobile;

e) The color of the front entrance door of a house;

f) The classification (grade level) of a student in a high school.

For questions 3 through 5 classify each **blue, bold faced number or description of a number** (there are two such descriptions in each problem) as a parameter or statistic (there is one of each in each problem). Carefully explain your reasoning (include a clear description of the population and the sample).

3. The receiving department of a company inspects a truckload of ball bearings to determine whether the bearings are within specified size limits. It is known, by the shipper but not by the receiving department, that the average diameter of the bearings in this truckload is **2.50**cm. The receiving department obtains a random sample of 100 ball bearings from this truckload and finds that the average diameter of these bearings is **2.55**cm.

4. A telephone sales outfit in Los Angeles uses a device that dials residential phone numbers in the city at random. Of the first 200 numbers dialed, **47%** are unlisted numbers. This is not surprising since **52%** of all Los Angeles residential phone numbers are unlisted.

5. It might be of interest to determine **the percentage of all personal vehicles registered in the United States that are more than 10 years old**. It would probably be easier to determine **the percentage of all personal vehicles registered in Louisiana that are more than 10 years old**.

6. A medical researcher wants to study the effects of a particular regimen of radiotherapy on the survival time (time until death) of patients suffering with a particular type of cancer.

a) What is a unit?

b) What is the variable of primary interest to the medical researcher?

c) What is the population of interest to the medical researcher.(*i.e.*, What is the target population?)

In parts d and e you will need to describe what you believe would be a plausible sampled population and how it might differ from the target population of part c.

d. Describe how the researcher could select a sample from the population and describe the sampled population determined by your method of obtaining a sample.

e. What problems might arise in sampling from this population?

7. Ten vehicles were selected at random from a partial listing of all the vehicles that have been issued campus parking permits, and the data tabulated below were recorded. Note: The list that the sample was selected from was created a few weeks before the semester began and does not include all vehicles with campus parking permits.

Vehicle	**Type**	**Make**	**Color**	**Age of vehicle (years)**	**commute distance (miles)**
1	car	Honda	blue	8	12
2	car	Ford	white	7	30
3	truck	Chevy	brown	2	18
4	car	Toyota	white	3	6
5	truck	Toyota	black	9	4
6	motorcycle	Harley	black	3	28
7	car	Honda	green	6	45
8	truck	Ford	silver	10	10
9	motorcycle	Honda	red	1	4
10	car	Nissan	white	3	18

a) What is a unit?

b) What is the population of interest? (*i.e.*, What is the target population?)

c) What is the population we have information about? (*i.e.*, What is the sampled population?)