

L02: Homework Answer Key

Instructions: You are encouraged to collaborate with other students on the homework, but it is important that you do your own work. Before working with someone else on the assignment, you should attempt each problem on your own.

1. Classify each of the following variables as categorical or quantitative.
 - a. Number of new automobiles sold at a dealership on a given day
Quantitative
 - b. Gender
Categorical
 - c. Total number of hours slept in the past 24 hours – rounded to the nearest hour
Quantitative
 - d. Handedness (which hand you write with)
Categorical
 - e. Species of trees sold at a nursery
Categorical
 - f. Weight in carats of an uncut diamond
Quantitative
 - g. Brand name for a pair of running shoes
Categorical

2. Explain the difference between an observational study and a designed experiment.

In a designed experiment, researchers manipulate the conditions that the participants experience. In an observational study researchers observe the responses of the individuals, without controlling the conditions experienced by the individuals.

3. Briefly explain each of the following types of sampling procedures.

- a. Simple random sample

If there is a list of all the items of the population, take a randomly selected number of them. (Software can be used to randomly select the items)

- b. Stratified random sample

Stratified sampling works well when the items are similar within each stratum and tend to differ from one stratum to another. A certain number of items is randomly selected from each of these strata.

c. Systematic random sample

This sample requires taking every k^{th} item in the population, beginning at a random starting point. Systematic sampling works well when the items are in a random, sequential ordering. If the items are not arranged randomly, a systematic sample can miss important parts of the population.

d. Cluster sample

A cluster sample consists of taking all items in one or more randomly selected clusters, or blocks. When the variation from one block to another is relatively low, compared to the variation within the block, cluster sampling is a reasonable way to get a sample.

4. State health care regulators wanted to assess how satisfied residents of nursing homes are with the care they receive. In order to obtain a sample, the regulators used a registry that contained all of the state's nursing homes listed in alphabetical order. They randomly chose a number between 1 and 20 and got "16." They selected the 16th nursing home on the list and every 20th nursing home thereafter until they reached the end of the list. Which sampling method did they use?
- Simple random sample
 - Cluster sample
 - Systematic random sample
 - Stratified random sample