Point Estimator

A **point estimator** is a single-valued estimate calculated from the sample data, which is intended to be close to the true population value.

DEFINITION

Can you be sure that the sample mean will always be close to the population mean? When dealing with random variables, nothing is certain, but there are methods of reducing the probable error. To understand how this is achieved, we must examine how the sample mean varies.

9.1 Exercises

Basic Concepts

1. Is sampling part of a deductive or an inductive process?
2. Why is the quality of sample data so important?
3. Why is randomness useful in sampling?
4. What is the problem with a voluntary sample?
5. What makes a sample biased?
6. What is a sampling frame and why is it important?
7. Discuss how you would draw a simple random sample of the people in your town.
8. True or False: Determining a well-defined population is easy when developing a sampling frame.
9. What is a pseudo-random number generator? How is it not completely?
10. Is the sample mean always close to the population mean?
11. What is the sampling distribution of the sample mean?
12. Why is the sample mean a random variable?
13. What is a point estimator?
14. Explain the meaning of the "distribution of a variable" in the context of statistics.
15. Explain how a statistic can have a distribution.

Exercises

Data

stat.hawkeslearning.com
Data Sets > Beers and Breweries

16. Obtain a random sample of 15 beers from the Beers and Breweries data set. Describe how you selected the sample.

©HAWKES LEARNING

17. Obtain a random sample of 12 houses (list the IDs) from the Dunes West subdivision in the Mount Pleasant Real Estate data set. Describe how you selected the sample.

Data

stat.hawkeslearning.com

Data Sets > Mount Pleasant Real Estate Data

18. A magazine reported the results of a survey in which readers were asked to send in their responses to several questions regarding good eating. Consider the reported results to the question, *How often do you eat chocolate?*

Survey Responses	
Category	**% of Responses**
Frequently	13
Occasionally	45
Seldom	37
Never	5

a. Were the responses to this survey obtained using voluntary sampling techniques? Explain your answer.

b. What types of biases may be present in the responses?

c. Is 13% a reasonable estimate of the proportion of all Americans who eat chocolate frequently? Explain.

19. A magazine reported the results of a survey in which readers were asked to send in their responses to several questions regarding anger. Consider the reported results to the question, *How long do you usually stay angry?*

Survey Responses	
Category	**% of Responses**
A few hours or less	48
A day	12
Several days	9
A month	1
I hold a grudge indefinitely	22
It depends on the situation	8

a. Were the responses to this survey obtained using voluntary sampling techniques? Explain your answer.

b. What types of biases may be present in the responses?

c. Is 22% a reasonable estimate of the proportion of all Americans who hold a grudge indefinitely? Explain.

©HAWKES LEARNING

20. Students in a marketing class have been asked to conduct a survey to determine whether or not there is a demand for an insurance program at a local college. The students decide to randomly select students from the local college and mail them a questionnaire regarding the insurance program. Of the 150 surveys that were mailed, 50 students responded to the following survey item: *Pick the category which best describes your interest in an insurance program.*

Survey Responses	
Category	**% of Responses**
Very Interested	50
Somewhat Interested	15
Interested	10
Not Very Interested	5
Not At All Interested	20

a. What types of biases may be present in the responses?

b. Is 50% a reasonable estimate of the proportion of all students who would be very interested in an insurance program at the local college? Explain.

c. Is 50% a reasonable estimate of the proportion of all business majors who would be very interested in an insurance program at the local college? Explain.

d. What strategies do you think the marketing students could have used to get a less biased response to their survey?

e. Suppose the program was created and only a few people registered. How could the survey question have been reworded to better predict actual enrollment?

21. Shortly after acquiring Twitter, Elon Musk created a poll asking: *Should I step down as head of Twitter? I will abide by the results of this poll.* The results of the particular survey were 57.5% yes and 42.5% no.

a. How would you describe this sampling methodology?

b. What biases may exist in this sampling method?

c. Is it reasonable to believe that the results of the survey reflect the attitudes of the Twitter users on this issue?

©HAWKES LEARNING