MAY 29, 2019

UNIT 9: PROBABILITY AND STATISTICS

9.4: SELECTING A SAMPLE

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MATH 9

WHAT'S THE POINT OF TODAY'S LESSON?

We will continue working on the Math 9 Specific Curriculum Outcome (SCO) "Statistics and Probability 2" OR "SP2" which states:

"Select and defend the choice of using either a population or a sample of a population to answer a question."

HOMEWORK QUESTIONS?
(pages 440 / 441, #3, 4, 6, 7, 8, 9 and 10)

Types of Probability

1. Theoretical Probability
2. Experimental Probability
3. Subjective Judgment

Problems with Data Collection

1. Ethics
2. Cost
3. Timing
4. Time
5. Use of language
6. Privacy
7. Cultural Sensitivity
8. Bias

Selecting A Sample

As you know, we choose a sample of a population when we are unable to do a census. To do this, you must know the different types of sampling methods. We will discuss 6 sampling methods.

** Notes are on page 446 of your textbook!

SIMPLE RANDOM SAMPLING

I **Each member of the population has an equal chance of being selected.**

EXAMPLE:

To select a random sample of 5 students from your math class, each student is assigned a number, and 5 numbers are drawn from a hat.

II

SYSTEMATIC OR INTERVAL SAMPLING

Every n^{th} member of the population is selected.

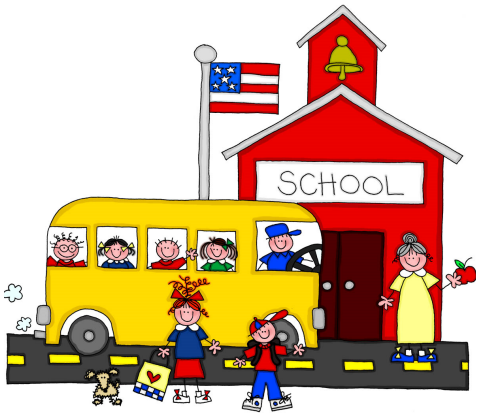
This method is often used in manufacturing, for example every 20th product in an assembly line is tested for quality. If the item is destroyed or unusable after being sampled, then the sample is a destructive sample.

III

CLUSTER SAMPLING

Every member of each randomly chosen group of the population is selected.

For example, each grade represents a group of the school population. One grade in your school is chosen randomly, and all students in that grade are selected.



IV

SELF-SELECTED SAMPLING

Only members who are interested and volunteer to participate.

For example, if a radio station conducts a telephone survey, only people who are interested will call.

V

CONVENIENCE SAMPLING

Only members of the population who are convenient to include are selected.

For example, for a survey about grocery shopping habits, people in a grocery store are approached and questioned.

VI

STRATIFIED RANDOM SAMPLING

Some members from each group of the population are randomly selected.

For example, 5 randomly chosen students from each grade in a school could be selected, even if each grade has a different number of students.

Identifying Appropriate Samples

The student leadership class wants to find out if students would like the cafeteria to have longer hours. Several sampling methods were suggested.

Determine the type of sampling method in each suggestion and explain whether each method suggested is appropriate.

a) Every student's name is put into a box, and 100 names are selected randomly to be surveyed.

b) Every 5th person entering the school is selected.

c) Each person on the leadership team asks his or her friends.

d) An announcement is made asking anyone who wishes to participate to fill in a ballot.

SUGGESTED SOLUTIONS:

a) Type: Simple Random Sampling
Appropriate?
Yes, every student has an equal chance of being selected.

b) Type: Systematic Sampling
Appropriate?
Yes depending on WHEN you ask the students. If the student is arriving early, then they would appreciate longer hours.

c) Type: Convenience Sampling
Appropriate?
No, friends often have similar views.

d) Type: Self-selected Sampling
Appropriate?
No, only students who have strong opinion about this topic may respond.

Choosing Appropriate Samples

A company packages boxes of granola bars. The quality-control manager inspects the first 5 boxes each morning to ensure that each has the same number and type of granola bars.

a) Is this a good way of ensuring quality control? Explain.

b) Suggest 2 other methods of sampling that would be appropriate. Explain why each is appropriate.

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a) No, the people working on the assembly line may be more alert in the morning, so the boxes they fill in the mornings may be more likely to meet standards and pass inspection; however, the boxes filled later in the day, which may not meet standards, are never inspected.

b) i) Systematic sampling: Allows the manager to inspect several boxes throughout the day. (EXAMPLE: Every 50th box is inspected.)

ii) Simple Random Sampling: Ensures each box has an equal chance of being selected.

CONCEPT REINFORCEMENT:

MMS9:

PAGE 448: #3 TO #6

PAGE 449: #9, #10 & #12