

AP Statistics – Sampling Procedures Practice

Write out your responses to these problems on separate paper. When asked to describe a sampling procedure, your description must be clear enough for another person to follow without confusion.

1. **IPHONES** Suppose 1,000 iPhones are produced at a factory today. Management would like to ensure that the phones' display screens meet their quality standards before shipping them to retail stores. Since it takes about 10 minutes to inspect an individual phone's display screen, managers decide to inspect a sample of 20 phones from the day's production.
 - a) An eager employee suggests that it would be easy to inspect the last 20 iPhones that were produced today. Why isn't this a good idea?
 - b) Another employee recommends inspecting every 50th iPhone that is produced. What type of sampling procedure is this? Explain carefully why this sampling method is not an SRS (simple random sample).
2. **GENDER DISCRIMINATION** A corporation employs 250 engineers – 200 of whom are male, 50 of whom are female. In response to allegations of gender-discrimination in the workplace, the human resources department wishes to select a random sample of 25 employees to participate in a “workplace environment” survey. They decide to select a **stratified random sample** of 20 males and 5 females to participate in the survey.
 - a) Carefully describe a process for randomly selecting such a sample.
 - b) Explain why this sampling method does not qualify as a type of simple random sample (SRS).
 - c) One acceptable method of carrying out a **simple random sample** would be as follows:
 - Assign each of the 250 employees a unique number from 1 – 250
 - Write each number on a separate slip of paper (of roughly equal size), and put all 250 slips of paper into a really large hat.
 - Stir the slips of paper around to mix them thoroughly.
 - Without looking, draw out 50 slips (without replacing any of them). The 50 employees that have their numbers drawn will be asked to participate in the survey.

Name one statistical advantage of using a **stratified random sample** (as you described in part “a”) over using a **simple random sample**. Explain **why** this is an advantage in the context of this situation.
3. **HIGH-SPEED INTERNET** Laying fiber-optic cable for high-speed internet is an expensive process. Cable companies want to make sure that, if they extend their lines out to less dense suburban or rural areas, there will be sufficient demand and the work will be cost-effective. In the rural town of Podunk, the local cable company decides to conduct a survey to determine the proportion of households in a local subdivision that would buy their internet service. The subdivision has 24 blocks, and each block has exactly 10 households, for a total of 240 households.
 - a) Carefully describe a method of randomly selecting 50 households by using a **simple random sample (SRS)**.
 - b) For convenience, the cable company may opt to use a cluster sampling method, in which each of the 24 blocks in the subdivision is treated as a cluster. Describe a process for randomly selecting 50 households using a **cluster sampling method**.
4. **SLEEPLESS NIGHTS** How much sleep do high school students get on a typical school night? An interested student designed a survey to find out. To make data collection easier, the student surveyed the first 100 students to arrive at school on a particular morning. These students reported an average of 7.2 hours of sleep on the previous night. Explain why this sampling method is biased. Is 7.2 hours probably higher or lower than the true average amount of sleep on the previous night for all students at the school? Why?