

Packet Pg 9-10

1a. Scott, Swokowski, Barrett, Burns, Flury, Kempthorne, Colon, Juarez

b. Sample answer: The first 8 students in the ordered list are assigned to Section 1, the second set of 8 students are assigned to Section 2, and so forth. A complete listing of students and their sections appears below.

Answers will vary

2. a. The population is the set of students entering a college. The sample is the group of students questioned by this professor during their orientation.

b. The population consists of patients suffering from arthritic knees. The sample consists of 10 of the physical therapist's patients who had arthritic knees.

3. a. The population consists of all students who graduated from this university at least five years ago. (That way you can determine what they were doing 5 years after graduation.) You may want to narrow the population to students who graduated between 5 and 8 years ago or narrow even further to students who graduated exactly 5 years ago.

b. The cost to conduct a census would be too high and it would take too long to gather the results. If a survey is mailed to the graduates, you would have to track down those who didn't respond and try to get their information with one-on-one phone calls or home visits. So, this would greatly add to the time required to gather this information. Furthermore, no matter how hard you tried, it would be impossible to track down every graduate who graduated 5 or more years ago. Some will have left the area (or even the country) without providing forwarding addresses. Given a complete list of graduates in the population of interest, you could focus on a sample. Since the size is small, you could contact each person in the sample.

4. a. Sample answer:

Pros of conducting a census:

- If it is possible to contact everyone in the population, you get a true measure of the proportion of the population that supports the measure.
- Not only do you know the overall population proportion supporting the measure, you can also determine if there are specific subgroups of the population (even if the subgroup is a low percentage of the population) that oppose the measure.

Cons of conducting a census:

- It may not be possible to contact everyone in the population in one month. Some people may be away that month. Others may not want to be contacted at all and hence those people's views will not be represented in the census.
- If it is a large population, you may not have the manpower to contact everyone in one month.
- It will cost more to conduct a census than to take a sample.

b. Sample answer:

Pros of taking a sample:

- Costs would generally be lower than for a census.
- If good sampling techniques are used, the results collected from the sample should be representative of the views of the population.
- It may take less time to gather and analyze the data.

Cons of taking a sample:

- Data may not be representative of the population. This is particularly true if the sample size is small or if an inadequate sampling plan (such as voluntary sampling) is used.
- There is variability due to sampling. Different samples could lead to different results.
- Since you are working with a sample, you may not be able to get detailed information about certain subgroups within the population who oppose the measure, particularly if those subgroups are small in comparison to the population. (This problem may be fixed by revising the sampling plan.)

Day 3

Understand **bias** that comes along with sampling

List 3 of the methods of sampling we have discussed:

1. **SRS**
2. **Convenience**
3. **Multi-stage**
Systematic
Stratified
Cluster
Voluntary

There are 5 bias' that come up in sampling. They are the following:

1. Response bias - [↑] design that may influence the response.
↑ Principal asks about drug use
- ↓ 2. Non-response bias - opinions of those who don't respond (for whatever reason) may be different from those who do.
3. Undercoverage bias some portion of the population is not sampled ~~of~~ has smaller representation than in the general population.
4. Voluntary response bias
- individuals can choose to participate or not
- Biased toward those with strong opinion (middle opinion don't usually respond)
5. Convenience sample/bias
- only those who are convenient.
May not represent the entire population

Read pg. 229-231

HW 9-3

1.

The principal of a small elementary school wants to select a simple random sample of 24 students. The school has 12 classrooms with 18 students in each class. She decides to randomly select two students from each classroom. Is this a simple random sample?

- A) No, because not all combinations of 24 students could have been chosen.
- B) No, because each student did not have an equal chance of being selected.
- C) Yes, because a stratified sample is a type of simple random sample.
- D) Yes, because the students were selected at random.

2.

The shift manager at a manufacturing plant calls each of the employees into his office and asks them a series of questions about job satisfaction. This method of polling is likely to result in what type of bias?

- A) response bias
- B) voluntary response bias
- C) undercoverage
- D) none of these

3.

A chemistry professor who teaches a large lecture class gives a survey during class about how he can make the class more interesting. He is hoping he can get more students to attend his class. This survey method suffers from which of the following?

- A) voluntary response bias
- B) nonresponse bias
- C) response bias
- D) undercoverage
- E) None of the above

From page 238, try # 18,19,20. For each question, identify the sampling method and any bias.

18. The Environmental Protection Agency took soil samples at 16 locations near a former industrial waste dump and checked each for evidence of toxic chemicals. They found no elevated levels of any harmful substances.

19. State police set up a roadblock to estimate the percentage of cars with up-to-date registration, insurance, and safety inspection stickers. They usually find problems with about 10% of the cars they stop.

20. A company packaging snack foods maintains quality control by randomly selecting 10 cases from each day's production and weighing the bags. Then they open one bag from each case and inspect the contents.