Section 9.2
Survey Sampling Methods
Reading Homework

- Read Section 9.3
- Do problem 18
Vocabulary worksheet

• Do problems 3, 4, 10, and 12.
Independent Sampling

- Each member of the population has the same *fixed chance* of being selected for the sample regardless of whether other members of the population were selected.
- The size of the sample cannot be selected ahead of time.
In general, the strata should be chosen to be roughly homogeneous (e.g., men v. women, Republicans v. Democrats, Huskers v. Sooners, etc.). When the sample is chosen, it is often chosen so that the number chosen from each stratum is proportional to the size of that stratum.
Cluster Sampling

- Population divided into nonoverlapping subsets, called *sampling units*, or *clusters*.
- Then clusters are selected randomly and elements in the clusters are sampled.

Typically, a cluster will be geographically small (such as a household or dorm).

E.g., one may be interested in gauging student opinion on some university issue.
1-in-\(k\) Systematic Sampling

- Decide ahead of time what proportion of the population we want to sample.
- E.g., we want to select 1 out of every 8 elements.
- Randomly choose a number between 1 and 8, e.g., 4.
- Pick 4th element from every group of 8.

E.g., choosing 1 out of 10 cars off the production line.

Question: any bias in this method? (regularity of which it occurs)
Quota Sampling

- Population is divided into mutually exclusive subgroups, as in stratified sampling.
- Then a judgment is made on what to include.

Forces the sample to be representative for important variables by requiring that quotas are filled for respondents in various categories.

Sometimes difficult to know ahead of time which variables are important (race, socioeconomic status, gender, etc.)

E.g., interview 200 women and 300 men between ages of 45 and 60.

E.g., 12.7% of U.S. population is African-American, so any random sample should be 12.7% African-American. If it’s not, one could try to interview more African-Americans.
• A jury-duty coordinator will send notices to a sample of the 2345 registered voters in a small town. In order to have a sufficiently large pool of potential jurors, the coordinator has to send notices to 20% of the registered voters. Explain why a 20% independent sample might not be a good choice of method for this jury-duty selection process.

In a 20% independent sample, each registered voter would have a 20% chance of being selected. There is no guarantee, however, that 20% of the registered voters would be selected. The sample could end up containing less than 20% of the voters.
Which sampling procedure is being used?

- A quality-control inspector selected every 20th DVD player as it came off an assembly line.
- A city planner divided a city into parcels measuring 1 city block by 1 city block. Fifty parcels were selected at random and everyone in each parcel was interviewed about a recent flood.
- A newspaper selected 60 rural and 60 urban residents and interviewed them about a new tax proposal.

- a 1-in-k systematic sample
- a cluster sample
- a quota sample