

Homework 9.6: Sampling

Math 3

Name: Key!

Directions: Identify the sampling method. Then identify any bias in each method.

1. A teacher committee wants to find how much time students spend reading each week. They ask students as they enter the library.

Convenience sample → bias: students who go to the lib may read more than those who don't

2. The students planning the junior class party want to know what kinds of pizza to buy. They ask the pizza restaurant what kinds sell the most.

Convenience sample → bias: students may want something other than what the restaurant sells the most of.

3. The county road department wants to know which roads cause the most concern among the residents of the county. They ask the local restaurants to hand out survey forms for customers to return by mail.

Voluntary-Response sample → bias: Not everyone who lives in the county may eat at the local restaurants

Directions: For questions #4-7, identify any bias in each survey question.

4. Do you believe that kids should go to school year-round because they are responsible for the rise in petty crime during the summer months?

Combining 2 issues: year round school & crime
→ possible strong reaction

5. Isn't our local government not aware of our current traffic problems?

Double negatives

6. Shouldn't our school do its part to end global warming by starting a recycling program?

Leading question

7. a. What sampling method could you use to find the percent of people in your community who support tougher penalties for running red lights?

Random sample, maybe from a phone book?

- b. What is an example of a survey question that is likely to yield unbiased information?

8. A committee surveys public response to a plan to add bicycle lanes to downtown city streets. Describe a sampling method that can be used for each population.

a. Bicyclists

interview random ppl at several local bike shops

b. car drivers

call random ppl from a list of all driver's license holders in the city

c. downtown business owners

Send surveys to all downtown businesses.

9. A television show's website asks every 20th person who visits the site to name their favorite TV star.
- What sampling method is the survey using?

Convenience

- Describe any bias in the sampling method.

pp1 who visit the show's website are more likely than the general TV viewer to pick the show's star as their favorite

Multiple Choice

10. The School Dance Committee conducts a survey to find what type of music students would like to hear at the next dance. Which is an example of a random sample?

- Call 20% of the people in the senior class directory.
- Interview every 10th student as they enter the school.
- Ask every 5th person leaving a school orchestra concert.
- Set up a jazz website where students can list their 3 favorite songs.

11. Which is a characteristic of a biased survey question?

- It is about a controversial issue.
- It produces inaccurate results.
- It is about a well-known person.
- It is about a very unpopular person.

Extension: When you take a random sample of size n from a large population, the sample has a margin of error of approximately $\pm \frac{1}{\sqrt{n}}$. Approximate the margin of error for each sample.

$$ME = \pm \frac{1}{\sqrt{n}}$$

12. In a traffic survey, 42% of the 1287 drivers passing through the checkpoint were traveling more than 100 miles from home.

$$ME = \pm \frac{1}{\sqrt{1287}} = \pm 0.028 = \pm 2.8\%$$

13. In one lake, 30% of the last 323 fish caught have a certain chemical present in their body.

$$ME = \pm \frac{1}{\sqrt{323}} = \pm 0.056 = \pm 5.6\%$$

14. A certain survey has a margin of error of $\pm 3\%$. About how many people participated in the survey?

$$0.03 = \frac{1}{\sqrt{n}} \quad \sqrt{n} = \left(\frac{1}{0.03}\right)^2 \quad n \approx 1111 \text{ people}$$

$$0.03 \sqrt{n} = 1$$

15. Describe the relationship between a change in the sample size and the change in the margin of error.

As sample size increases, margin of error decreases.
As margin of error increases, sample size decreases.