

Algebra 2 - Sampling, Surveys and Experiments - Quiz

Common Core S-IC.A.1, S-IC.A.2, S-IC.B.3, S-IC.B.4, S-IC.B.5, S-IC.B.6 · maths-pdf.fr/en/

Name: _____ Class: _____ Date: ____/____/____

Answer ten multiple-choice questions on sampling, surveys, and experiments. Choose one option for each question, then read the explanation to see why the correct choice works and which mistake, such as confusing an observational study with an experiment, each wrong choice shows.

Algebra 2 · Common Core State Standards: **S-IC.A.1, S-IC.A.2, S-IC.B.3, S-IC.B.4, S-IC.B.5, S-IC.B.6**

Questions

Question 1

What kind of sample gives every member of the population an equal chance of being chosen?

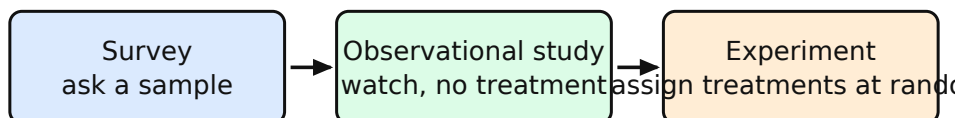
- A. A convenience sample
- B. A random sample
- C. A voluntary sample
- D. A biased sample

Question 2

Which study can show cause and effect?

- A. A survey
- B. An observational study
- C. A voluntary online poll
- D. A randomized experiment

Question 3



Only an experiment with random assignment can show cause and effect.

In the diagram, which study assigns treatments at random?

- A. Survey
- B. Observational study
- C. Experiment
- D. None of them

Question 4

A poll of 400 people has a margin of error of about

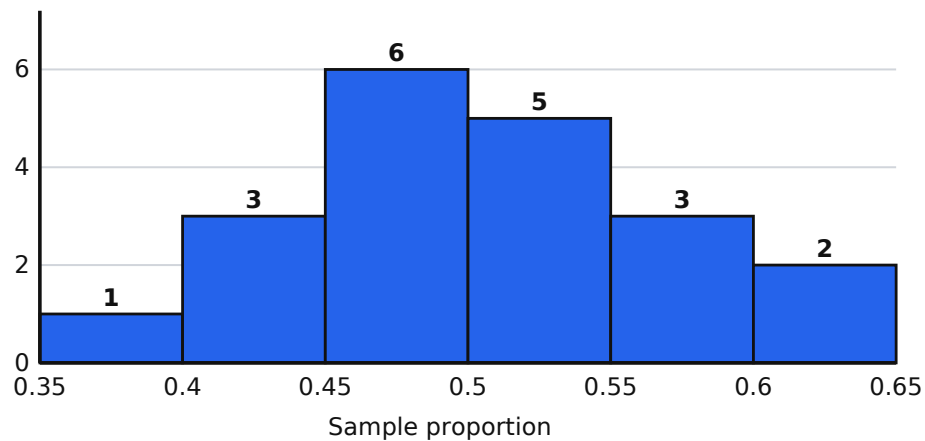
- A. 5%
- B. 2%
- C. 20%
- D. 0.5%

Question 5

Which change reduces the margin of error?

- A. Increasing the population size
- B. Surveying only volunteers
- C. Increasing the sample size
- D. Using a convenience sample

Question 6



Twenty simulated sample proportions from random samples of 100.

Most simulated sample proportions are close to which value?

- A. 0.50
- B. 0.35
- C. 0.65
- D. 1.00

Question 7

A volunteer online survey is likely to be biased because

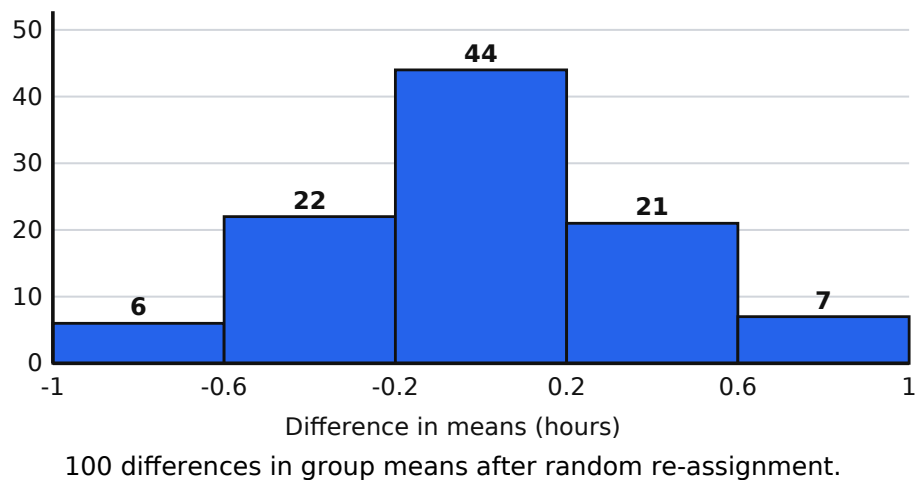
- A. It is too large
- B. People choose themselves, so the sample is not representative
- C. It is random
- D. It has a control group

Question 8

In an experiment, the control group is the group that

- A. Receives the new treatment
- B. Receives no treatment or a placebo
- C. Chooses its own treatment
- D. Is not measured

Question 9



An observed difference lies far to the right of all 100 simulated differences. What does that suggest?

- A. The data are biased
- B. The sample is too small
- C. The treatment had no effect
- D. The difference is unlikely to be due to chance

Question 10

Why can't an observational study prove cause and effect?

- A. Confounding variables may explain the pattern
- B. It uses random samples

- C. It always has a small sample
- D. It uses a control group

Answers

1. **B** – Equal chances are the definition of a random sample.
2. **D** – Only random assignment of treatments balances other variables so that cause and effect can be inferred.
3. **C** – The experiment is the one that assigns treatments, which allows conclusions about cause.
4. **A** – $1/\sqrt{400} = 1/20 = 0.05$.
5. **C** – The margin of error shrinks as the sample size increases.
6. **A** – The tallest bars are at 0.45 and 0.50, around the true value 0.5.
7. **B** – Voluntary response samples overrepresent people with strong opinions.
8. **B** – The control group provides a baseline for comparison.
9. **D** – A result that rarely occurs by chance alone suggests a real effect.
10. **A** – Without random assignment, other differences between the groups may cause the result.

Remember

- A random sample is representative; a convenience sample is biased.
- Surveys, observational studies, and experiments answer different questions.
- Random assignment supports cause-and-effect conclusions.
- Margin of error for a proportion $\approx 1/\sqrt{n}$.
- Simulation shows how likely a result is by chance.