LESSON MAKER PRO

Sample to Population

Use random samples to make careful estimates.

HIGH SCHOOL · HSS-IC.A.1

CCSS.Math.Content.HSS-IC.A.1 "Understand statistics as a process for making inferences about population parameters based on a random sample from that population."

NAME _____ DATE _____

FROM SAMPLE TO ESTIMATE

A population is the full group you want to know about. A random sample can give a sample proportion that estimates the population proportion, but a biased sample cannot support a reliable inference.

WORKED EXAMPLE

A random sample of 48 library visitors finds that 36 use e-books. Estimate the percentage of all library visitors who use e-books.

1. Sample proportion = 36/48.
2. 36/48 = 3/4 = 0.75.
3. 0.75 = 75%.

Answer: About 75% of all library visitors use e-books.

PRACTICE 5 problems

1 A school has 1,200 students and randomly surveys 28 of them. What is the population?

ANSWER _____

2 A counselor numbers all 900 students and uses a random-number table to choose 24 students. Is this a random sample?

ANSWER _____

3 In a random sample of 25 students, 17 prefer digital notes. Estimate the percentage of all students who prefer digital notes.

ANSWER _____

4 A website asks visitors to click a button if they support a policy. Why is this weak evidence about all students?

ANSWER _____

5 In a random sample of 80 students, 52 bring a water bottle daily. State the statistic and the parameter being estimated.

ANSWER _____

_____

APPLY IT Show your work

1 The student council wants to estimate support for a later school start time. It randomly selects 40 students from the school roster, and 26 support the change. Estimate the percentage of all students who support a later start time.

WORK SPACE

ANSWER _____

2 A game club asks 18 members at its meeting whether the school should add an esports team. Fifteen say yes. Can the club use 15/18 to estimate support among all students? Explain.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A club wants to estimate the percentage of students who watch esports. Survey A randomly selects 50 students and finds 32 who watch esports. Survey B is an Instagram poll with 200 responses, including 150 who watch esports. Which survey gives the more reliable estimate for all students? Give the estimate and explain why.

WORK SPACE AND ANSWER

ANSWER KEY

Sample to Population

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A school has 1,200 students and randomly surveys 28 of them. What is the population?	**All 1,200 students at the school.**
2	A counselor numbers all 900 students and uses a random-number table to choose 24 students. Is this a random sample?	**Yes. Each student can be selected by the random-number process.**
3	In a random sample of 25 students, 17 prefer digital notes. Estimate the percentage of all students who prefer digital notes.	**17/25 = 68%, so about 68%.**
4	A website asks visitors to click a button if they support a policy. Why is this weak evidence about all students?	**Visitors choose themselves, so it is a voluntary-response sample, not a random sample.**
5	In a random sample of 80 students, 52 bring a water bottle daily. State the statistic and the parameter being estimated.	**Statistic: 52/80 = 65%. Parameter: the true proportion of all students who bring a water bottle daily.**

PART 2 · APPLY IT

1. **About 65% of all students support it.** 26/40 = 65%, so about 65% of all students support it. Use the sample proportion, 26/40. Because the students were randomly selected, this proportion can estimate the population proportion.
2. **No.** Club members are not a random sample of all students and may be more likely to support esports. The sample is a convenience sample from the game club, not a random sample from the school. Its proportion may be biased.

CHALLENGE

Survey A. Its estimate is 32/50 = 64%. Survey A uses a random sample, while Survey B is a voluntary-response poll that may be biased.

Accept equivalent forms such as 13/20, 0.65, and 65% where appropriate. For explanation items, accept any clear statement that random selection supports inference and voluntary or convenience sampling can create bias.