LESSON MAKER PRO

Survey Signal Lab

Use samples and simulations to estimate a population.

HIGH SCHOOL · HSS-IC.B.4

CCSS.Math.Content.HSS-IC.B.4 "Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling."

NAME _____ DATE _____

ESTIMATE AND CHECK

A sample proportion estimates the proportion in the whole population. Use the middle range from many simulated random samples, then take half of its width to find a margin of error.

WORKED EXAMPLE

A random survey finds that 28 of 40 students prefer later library hours. A simulation gives a middle range from 0.62 to 0.78.

1. Find the sample proportion: 28/40 = 0.70.
2. Find the range width: 0.78 - 0.62 = 0.16.
3. Take half the width: 0.16/2 = 0.08.
4. Use 0.70 as the estimate with a margin of error of 0.08.

Answer: Estimated proportion: 0.70, margin of error: 0.08.

PRACTICE 5 problems

1 A random survey finds that 15 of 25 students bring a reusable water bottle. Estimate the population proportion.

ANSWER _____

2 A simulation gives a central range from 0.31 to 0.39. Find the margin of error.

ANSWER _____

3 In a random sample, 16 of 25 students have a part-time job. Estimate the population proportion.

ANSWER _____

4 A sample estimate is 0.52 with a simulated margin of error of 0.05. Give the estimated interval.

ANSWER _____

5 A survey estimate is 0.50 with a margin of error of 0.06. For 500 students, estimate the number and give the likely range.

ANSWER _____

APPLY IT Show your work

1 A student council randomly surveys 45 students. Twenty-seven say they would attend an after-school esports event. A simulation gives a central range from 0.48 to 0.72. Estimate the proportion, the margin of error, and the number who might attend out of 900 students.

WORK SPACE

ANSWER _____

2 A media club randomly surveys 32 students. Twenty-four use a music streaming app every day. A simulation gives a central range from 0.65 to 0.85. Estimate the proportion, the margin of error, and the number of daily users in a school of 400 students.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A random survey estimates a proportion of 0.60. In 100 simulations, 4 estimates are below 0.54, 92 are from 0.54 through 0.66, and 4 are above 0.66. What margin of error does this simulation suggest? Write the estimate with its margin of error and explain why.

WORK SPACE AND ANSWER

ANSWER KEY

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A random survey finds that 15 of 25 students bring a reusable water bottle. Estimate the population proportion.	**3/5**
2	A simulation gives a central range from 0.31 to 0.39. Find the margin of error.	**0.04**
3	In a random sample, 16 of 25 students have a part-time job. Estimate the population proportion.	**0.64**
4	A sample estimate is 0.52 with a simulated margin of error of 0.05. Give the estimated interval.	**0.47 to 0.57**
5	A survey estimate is 0.50 with a margin of error of 0.06. For 500 students, estimate the number and give the likely range.	**250 students, with a range of 220 to 280 students**

PART 2 · APPLY IT

1. **Estimated proportion: 0.60. Margin of error: 0.12. Estimated number: 540 students.** Compute 27/45 = 0.60. Half of 0.72 - 0.48 is 0.12, and 0.60 x 900 = 540.
2. **Estimated proportion: 3/4. Margin of error: 0.10. Estimated number: 300 students.** Compute 24/32 = 3/4. Half of 0.85 - 0.65 is 0.10, and 3/4 of 400 is 300.

CHALLENGE

Margin of error: 0.06. Estimate: 0.60 +/- 0.06. The central simulated estimates extend 0.06 below and above 0.60.

Accept equivalent fractions and decimals for proportions. Accept interval notation or plus/minus notation when the endpoints and margin of error are correct.