

Simulation Reality Check

Use simulated results to judge whether a sample result is likely.

HIGH SCHOOL • AII-S.IC.2

AII-S.IC.2 "Determine if a value for a sample proportion or sample mean is likely to occur based on a given simulation."

NAME _____

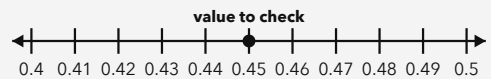
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USE THE SIMULATION

A simulation shows which sample results happen often and which happen rarely. A value is likely when it appears in many simulation trials or falls in a common range of results.

WORKED EXAMPLE

A simulation of 19 samples found that 15 sample proportions were from .42 through .48. Is a sample proportion of .45 likely?



1. Locate .45 in the simulated range from .42 through .48.
2. The range occurred in 15 of 19 trials.
3. Because it occurred often, the value is likely.

Answer: Likely.

PRACTICE 4 problems

- 1** In 28 simulations, 23 sample proportions were from .31 through .37. Is .34 likely?

ANSWER _____

- 2** In 32 simulated samples, a sample mean of 84 or higher occurred 4 times. Is a sample mean of 84 or higher likely?

ANSWER _____

- 3** In 27 simulations, 22 sample means were from 11 through 13. Is a sample mean of 12 likely?

ANSWER _____

- 4** In 46 simulations, a sample proportion of .73 or greater occurred 3 times. Is a sample proportion of .73 or greater likely?

ANSWER _____

APPLY IT Show your work

- 1** A streaming club simulates 50 random groups of students. In 43 groups, the mean weekly streaming time was from 5 to 7 hours. Is a mean of 6 hours likely?

WORK SPACE

ANSWER _____

- 2** A student council simulates 80 random samples of 25 students to predict support for a spirit-week theme. Use the table. Is a sample proportion of .68 likely? Explain.

SIMULATED SAMPLE PROPORTIONS

Sample proportion	Number of simulations
.52-.59	9
.60-.67	18
.68-.75	41
.76-.83	12

ANSWER _____

CHALLENGE One step up

A simulation has 90 trials. A sample mean below 68 occurred 7 times, from 68 through 72 occurred 74 times, and above 72 occurred 9 times. A student says a sample mean of 73 is likely because it is close to 72. Is the student correct? Explain using the simulation.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	In 28 simulations, 23 sample proportions were from .31 through .37. Is .34 likely?	Likely, because .34 is in a range that occurred in 23 of 28 simulations.
2	In 32 simulated samples, a sample mean of 84 or higher occurred 4 times. Is a sample mean of 84 or higher likely?	Unlikely, because it occurred in only 4 of 32 simulations.
3	In 27 simulations, 22 sample means were from 11 through 13. Is a sample mean of 12 likely?	Likely, because 12 is in a range that occurred in 22 of 27 simulations.
4	In 46 simulations, a sample proportion of .73 or greater occurred 3 times. Is a sample proportion of .73 or greater likely?	Unlikely, because it occurred in only 3 of 46 simulations.

PART 2 • APPLY IT

- Likely, because 6 hours is in a range that occurred in 43 of 50 simulations.** Find 6 in the range from 5 to 7. That range occurred in most trials.
- Likely. A proportion of .68 is in the .68-.75 range, which occurred in 41 of 80 simulations.** Locate .68 in the third interval. That interval occurred in more than half of the simulations.

CHALLENGE

No. A sample mean of 73 is above 72, and results above 72 occurred in 9 of 90 trials, or 1/10, so it is unlikely.

Accept equivalent statements that identify frequent results as likely and rare results as unlikely. For the challenge, accept 9/90 or 1/10 as the simulation-based rate.