LESSON MAKER PRO

Confidence Check

Read margins of error with meaning.

HIGH SCHOOL · MA.912.DP.1.5

MA.912.DP.1.5 "Interpret the margin of error of a mean or percentage from a data set. Interpret the confidence level corresponding to the margin of error."

NAME _____ DATE _____

READ THE RANGE

A result of p% +/- m% estimates the population percentage from p - m% to p + m%. A mean uses the same rule in its own units. At a stated confidence level, the sampling method would produce intervals containing the true value about that percent of the time.

WORKED EXAMPLE

A random sample has a mean commute time of 52 minutes with a margin of error of 4 minutes at 90% confidence. Interpret the result.

1. Start with 52 minutes.
2. Lower end: 52 - 4 = 48.
3. Upper end: 52 + 4 = 56.
4. Use the stated confidence level.

Answer: The population mean is estimated to be 48 to 56 minutes. We are 90% confident that this interval contains the population mean.

PRACTICE 5 problems

1 A poll estimates 64% with a margin of error of 3 percentage points. Write the interval.

ANSWER _____

2 A sample mean is 18 books with a margin of error of 2 books. Interpret the estimate.

ANSWER _____

3 At 95% confidence, an estimate is 71% +/- 5%. What does 95% confidence mean?

ANSWER _____

4 A report gives 39% ± 6 percentage points. Is 47% inside the interval? Does being outside make it impossible as the true population percentage? Explain.

ANSWER _____

5 Survey A is 82% +/- 2%. Survey B is 82% +/- 7%. Which estimate is more precise?

ANSWER _____

APPLY IT Show your work

1 Student council surveys 120 randomly selected students. It finds that 58% want a later start time, with a margin of error of 5 percentage points at 95% confidence. Write and interpret the interval.

WORK SPACE

ANSWER

2 A health class randomly samples 25 students and finds a mean of 7.5 hours of sleep per night, with a margin of error of 0.5 hour at 80% confidence. Write and interpret the interval.

WORK SPACE

ANSWER

CHALLENGE One step up

Two random polls at 95% confidence estimate support for a school club. Poll A is 46% +/- 3%, and Poll B is 51% +/- 3%. Do the intervals overlap? What can you conclude?

WORK SPACE AND ANSWER

ANSWER KEY

Confidence Check

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A poll estimates 64% with a margin of error of 3 percentage points. Write the interval.	**61% to 67%**
2	A sample mean is 18 books with a margin of error of 2 books. Interpret the estimate.	**The population mean is estimated to be 16 to 20 books.**
3	At 95% confidence, an estimate is 71% +/- 5%. What does 95% confidence mean?	**In repeated random samples using this method, about 95% of the intervals would contain the true population percentage.**
4	A report gives 39% ± 6 percentage points. Is 47% inside the interval? Does being outside make it impossible as the true population percentage? Explain.	**The interval is 33%–45%, so 47% is outside. That does not make 47% impossible: a confidence-interval procedure can miss the true population value.**
5	Survey A is 82% +/- 2%. Survey B is 82% +/- 7%. Which estimate is more precise?	**Survey A, because it has the smaller margin of error.**

PART 2 · APPLY IT

1. **53% to 63%. We are 95% confident that the population percentage who want a later start time is in this interval.** Subtract and add 5 to 58. Interpret 95% confidence as describing the reliability of the sampling method.
2. **7 to 8 hours. We are 80% confident that the population mean sleep time is in this interval.** Subtract and add 0.5 to 7.5. The interval estimates the population mean, not every student's sleep time.

CHALLENGE

Poll A: 43% to 49%. Poll B: 48% to 54%. The intervals overlap from 48% to 49%, so these estimates alone do not clearly show which population support percentage is higher.

Accept interval notation, such as [61%, 67%], when endpoints are correct. Confidence explanations should describe repeated random samples or intervals, not claim that 95% of individuals are in the interval.