LESSON MAKER PRO

Polls to Plans

Use sample results to make decisions.

HIGH SCHOOL · MM.D3D.C.20

MM.D3D.C.20 "Perform inference procedures based on the results of samples and experiments. a. Use a point estimator and margin of error to construct a confidence interval for a proportion or mean. b..."

NAME _____ DATE _____

ESTIMATE AND DECIDE

To make a confidence interval, subtract and add the margin of error to a sample estimate. The interval gives a range of plausible values for the whole group. For a decision that requires a minimum value, check the interval's lower end.

WORKED EXAMPLE

Use the club poll to estimate the share of all students who want the club.

CLUB POLL

Students surveyed	Students who said yes	Margin of error
60	18	7 percentage points

1. Sample estimate: 18/60 = 30%.
2. Lower end: 30% - 7% = 23%.
3. Upper end: 30% + 7% = 37%.

Answer: 23% to 37%

PRACTICE 4 problems

1 A poll estimates 40% support, with a margin of error of 4 percentage points. Find the confidence interval.

ANSWER _____

2 A sample mean is 72 minutes, with a margin of error of 3 minutes. Find the confidence interval.

ANSWER _____

3 In a poll of 50 students, 21 say yes. The margin of error is 8 percentage points. Find the confidence interval for the share who would say yes.

ANSWER _____

4 A poll estimates 53% support for a dance, with a margin of error of 2 percentage points. Find the interval. Does the entire interval show majority support?

ANSWER _____

APPLY IT Show your work

1 The school will open a music room only if the interval's lower end meets the required minimum. Use the poll results to find the interval and decide whether to open it.

MUSIC ROOM POLL

Support estimate	Margin of error	Required minimum
67%	6 percentage points	65%

ANSWER _____

2 The student council will request a second lunch line if the entire interval for mean wait time exceeds 12 minutes. The sample mean is 15 minutes, with a margin of error of 1 minute. Find the interval and make a decision.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A 95% confidence interval for support of a later start time is 52% to 58%. Test H_0: $p = 50\%$ against H_1: $p \neq 50\%$. Reject H_0 if 50% is outside the interval. State your decision and explain what a 5% significance level means if H_0 is true.

WORK SPACE AND ANSWER

Polls to Plans

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A poll estimates 40% support, with a margin of error of 4 percentage points. Find the confidence interval.	**36% to 44%**
2	A sample mean is 72 minutes, with a margin of error of 3 minutes. Find the confidence interval.	**69 to 75 minutes**
3	In a poll of 50 students, 21 say yes. The margin of error is 8 percentage points. Find the confidence interval for the share who would say yes.	**34% to 50%**
4	A poll estimates 53% support for a dance, with a margin of error of 2 percentage points. Find the interval. Does the entire interval show majority support?	**51% to 55%. Yes, the entire interval is above 50%.**

PART 2 · APPLY IT

1. **61% to 73%. Do not open it under this rule.** Subtract and add 6 percentage points to 67%. The lower end, 61%, is below the required 65%.
2. **14 to 16 minutes. Request a second lunch line.** The interval is 15 ± 1 minutes, or 14 to 16 minutes. Its lower end exceeds 12 minutes.

CHALLENGE

Reject H_0 because 50% is outside the interval. If support really is 50%, this test would wrongly reject H_0 in about 5% of repeated samples.

Accept equivalent interval notation and decisions supported by the correct endpoint. In the challenge, accept "Type I error" for wrongly rejecting a true null hypothesis.