LESSON MAKER PRO

Estimate the Range

Build confidence intervals from estimates and margins of error

HIGH SCHOOL · MM.D3D.C.20.a

MM.D3D.C.20.a "Use a point estimator and margin of error to construct a confidence interval for a proportion or mean."

NAME _____ DATE _____

THE BIG IDEA

To construct a confidence interval, subtract the margin of error from the point estimate for the lower endpoint, then add it for the upper endpoint. For a proportion written as a percent, add and subtract percentage points. For a mean, keep the same units as the estimate.

WORKED EXAMPLE

A poll estimates that 64% of students prefer an outdoor event. The margin of error is 7 percentage points. Construct a confidence interval for the proportion.

1. Point estimate: 64%. Margin of error: 7 percentage points.
2. Lower endpoint: 64% - 7% = 57%.
3. Upper endpoint: 64% + 7% = 71%.

Answer: 57% to 71%

PRACTICE 6 problems

1 A sample estimates a proportion at 28%, with a margin of error of 4 percentage points. Construct the confidence interval.

ANSWER _____

2 A sample mean is 18 minutes, with a margin of error of 3 minutes. Construct the confidence interval.

ANSWER _____

3 A sample estimates a proportion at 3/5, with a margin of error of 1/10. Construct the confidence interval using fractions.

ANSWER _____

4 A sample estimates a proportion at 82%, with a margin of error of 3 percentage points. Construct the confidence interval.

ANSWER _____

5 A sample mean is $120, with a margin of error of $15. Construct the confidence interval.

ANSWER _____

6 In a sample of 20 students, 14 chose the same lunch option. The margin of error is 10 percentage points. Find the sample proportion as a percent, then construct the confidence interval.

ANSWER _____

APPLY IT Show your work

1 A student council surveys students about adding a late bus after clubs. The table shows their responses. Use the sample proportion who said yes and a margin of error of 6 percentage points to construct a confidence interval for the proportion who support a late bus.

LATE BUS SURVEY

Response	Students
Yes	30
No	20

ANSWER _____

2 Students track their travel time to school. Their sample mean is 24 minutes, with a margin of error of 4 minutes. Construct a confidence interval for the mean travel time.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A student council poll reports a confidence interval of 42% to 58%. Find its point estimate and margin of error. Then use the same point estimate with half the margin of error to construct a new interval. Show your calculations.

WORK SPACE AND ANSWER

ANSWER KEY

Estimate the Range

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A sample estimates a proportion at 28%, with a margin of error of 4 percentage points. Construct the confidence interval.	**24% to 32%**
2	A sample mean is 18 minutes, with a margin of error of 3 minutes. Construct the confidence interval.	**15 to 21 minutes**
3	A sample estimates a proportion at 3/5, with a margin of error of 1/10. Construct the confidence interval using fractions.	**1/2 to 7/10**
4	A sample estimates a proportion at 82%, with a margin of error of 3 percentage points. Construct the confidence interval.	**79% to 85%**
5	A sample mean is $120, with a margin of error of $15. Construct the confidence interval.	**$105 to $135**
6	In a sample of 20 students, 14 chose the same lunch option. The margin of error is 10 percentage points. Find the sample proportion as a percent, then construct the confidence interval.	**70%; 60% to 80%**

PART 2 · APPLY IT

1. **54% to 66%** The sample proportion is 30/50 = 60%. Subtract and add 6 percentage points to get 54% and 66%.
2. **20 to 28 minutes** Subtract and add 4 minutes to the sample mean of 24 minutes.

CHALLENGE

Point estimate: (42% + 58%)/2 = 50%. Margin of error: 58% - 50% = 8 percentage points. Half the margin is 4 percentage points, so the new interval is 46% to 54%.

Accept equivalent interval notation and equivalent fractions or decimals for proportions. Percentage-point margins are added to and subtracted from the estimated percent.