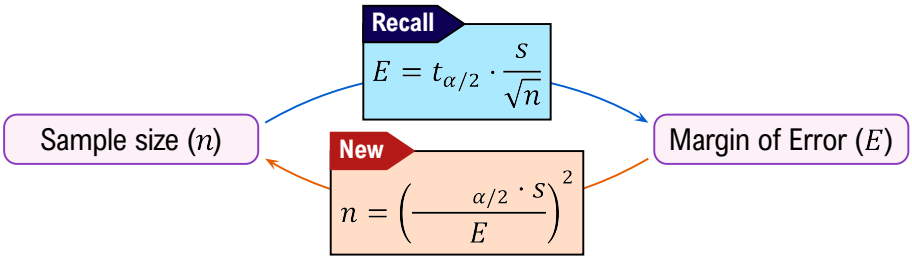
TOPIC: CONFIDENCE INTERVALS FOR POPULATION MEAN

Finding the Minimum Sample Size Needed for a Confidence Interval

◆ When you're not given a sample size, n, you'll need to determine it based on the given margin of error.

► We can *rearrange* the margin of error eqn. for n, plug in values, & round UP to next _____ number.



◆ Since finding a t-value requires knowing n ($df = n - 1$), use $z_{\alpha/2}$ to estimate $t_{\alpha/2}$.

EXAMPLE

A researcher wants to estimate the average amount of time (in minutes) college students spend exercising per day. She wants to construct a 95% confidence interval for the mean with a margin of error no greater than 3 minutes. A previous study suggests that the standard deviation of daily exercise time is approximately 12 minutes. What is the minimum sample size the researcher should use?

◆ If you're not given s or σ, estimate using the range rule of thumb: $s \approx \frac{\text{range}}{4}$

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PRACTICE

A puzzle company is interested in the average number of pieces in their jigsaw puzzles, so they plan to create a confidence interval for the true mean. The easiest puzzle in their line is 100 pieces, and the largest is 1000 pieces. Use the range rule of thumb to estimate the sample standard deviation.

PRACTICE

A bookstore is interested in the average length of books in its adult fiction section. Find the minimum sample size required to create a 99% confidence interval with a margin of error no more than 30 pages if…

(*A*) The standard deviation is known to be about 96 pages.

(*B*) The standard deviation is unknown, but the longest book is 697 pages and the shortest is 298 pages.