

Final Review – Part 1: Sample Size

Basics

- A sample size problem will ask you to find the sample size necessary to meet certain conditions.
- Look for a confidence level.
We want to be 95% confident that ...
- Look for a margin of error E , which is how close to the population parameter that we want our sample statistic to be.
We want the sample mean to be within 2 years of the true population mean, or we want the sample proportion to be within 3% of the true population proportion.

Sample Size for Estimating a Proportion

- The wording should indicate that we are trying to estimate a proportion or percentage.
- No standard deviation will be provided.
- The margin of error should be a percentage, and we need to convert that to a standard decimal.
If $E = 3%$, use $E = 0.03$.
- The width of the interval is twice the margin of error E .
- If an estimate of the population proportion is known, this is the “target proportion” in StatCrunch.
- If an estimate of the population proportion is not provided, use 0.5 for the target proportion in StatCrunch.
- StatCrunch steps:
Stat > Proportions > 1-sample > Power/Sample Size
Click on the “Confidence Interval Width” tab.
Enter the confidence level, target proportion, and width.
Press compute! to find the sample size.

Sample Size for Estimating a Mean

- The wording should indicate that we are trying to estimate a mean.
- A standard deviation will be given in the problem.
- The margin of error should be a number (not a percentage).
- The width of the interval is twice the margin of error E .
- StatCrunch steps:
Stat > Z-Statistics > 1-sample > Power/Sample Size
Click on the “Confidence Interval Width” tab.
Enter the confidence level, standard deviation, and width.
Press compute! to find the sample size.

Examples

1) A researcher wants to estimate the mean height of 8-year-old girls. It is known that the population standard deviation is 2.9 inches. How large of a sample is required to be 95% confident that the estimate is within 0.4 inches of the population mean?

“How large of a sample is required ...” → Sample Size Problem

Mean is mentioned in the problem, the data (heights) would be numerical, margin of error is a number not a percentage, standard deviation provided → Sample Size for Mean

Confidence Level: 0.95

Standard Deviation: 2.9

Margin of Error: 0.4

Width: $2(0.4) = 0.8$

ANSWER: 202

2) A president of COS wants to estimate the proportion of COS students that are female. How large of a sample is required to be 99% confident that the estimate is within 2% of the true population proportion?

“How large of a sample is required ...” → Sample Size Problem

Proportion is mentioned in the problem, the data (gender) would be categorical, margin of error is a percentage, no standard deviation provided → Sample Size for Proportion

Confidence Level: 0.99

Target Proportion: 0.5 (Since no estimate was given.)

Margin of Error: 0.02 (Decimal form of 2%)

Width: $2(0.02) = 0.04$

ANSWER: 4147