

Final Review – Part 2: Confidence Interval

Basics

- A confidence interval problem will ask you to construct a ___ % confidence interval.
- Look for a confidence level, and look for wording like ...
Construct a 95% confidence interval for ...
- Write your results in a sentence.
We are 95% confident that the mean lifespan for all adult males is between 70.3 and 72.7 years.
We are 90% confident that the proportion of COS students who are female is between 0.5403 and 0.6197.

Confidence Interval for a Proportion

- The wording should indicate that we are trying to estimate a proportion or percentage.
- The sample information provided will be of the form x out of n .
- The data gathered would be categorical, not numerical.
- No standard deviation will be provided.
- StatCrunch steps:
Stat > Proportions > 1-sample > With Summary
Enter x for the number of successes, and n for the number of observations.
Click on the Confidence Interval radio button and enter the confidence level.
Press compute! to find the lower limit and upper limit.

Confidence Interval for a Mean

- The wording should indicate that we are trying to estimate a mean.
- The sample information provided will either be a sample mean/sample standard deviation/ n or a set of numerical data.
- The data gathered would be numerical, not categorical.
- StatCrunch steps:
Given mean/s.d./ n
Stat > T-statistics > 1-sample > With Summary
Enter sample mean, standard deviation, size.
Click on the Confidence Interval radio button and enter the confidence level.
Press compute! to find the lower limit and upper limit.
Given data
Type data in one column.
Stat > T-statistics > 1-sample > With Data
Click on the Confidence Interval radio button and enter the confidence level.
Press compute! to find the lower limit and upper limit.

Examples

1) A random sample of 500 college students showed that 121 of them owned an iPhone. Construct a 90% confidence interval for the proportion of all college students that own an iPhone.

“Construct a 90% confidence interval for ...” → Confidence Interval Problem

Proportion is mentioned in the problem, sample information is 121 out of 500, the data (iPhone or No iPhone) would be categorical, no numerical data or standard deviation provided → Confidence Interval for Proportion

Number of Successes: 121

Number of Observations: 500

Confidence Level: 0.90

ANSWER: *We are 90% confident that the proportion of all college students who own an iPhone is between 0.2105 and 0.2735.*

2) A random sample of 45 salmon filets had their weights (in ounces) measured. The sample mean was 20.3 ounces, with a standard deviation of 2.3 ounces. Construct a 95% confidence interval for the mean weight of all salmon filets.

“Construct a 95% confidence interval for ...” → Confidence Interval Problem

Mean is mentioned in the problem, the data (weights) would be numerical, sample mean and standard deviation provided → Confidence Interval for Mean

Confidence Level: 0.95

Sample Mean: 20.3, Sample Standard Deviation: 2.3, Sample Size: 45

ANSWER: *We are 95% confident that the mean weight for all salmon filets is between 19.61 ounces and 20.99 ounces.*

3) A random sample of 8 students was asked how much they spent on books and supplies this semester.

\$255 \$325 \$400 \$190 \$300 \$300 \$315 \$280

Construct a 99% confidence interval for the mean costs for all college students.

“Construct a 99% confidence interval for ...” → Confidence Interval Problem

Mean is mentioned in the problem, the data provided are numerical → Confidence Interval for Mean

Confidence Level: 0.99

ANSWER: *We are 99% confident that the mean cost for all students is between \$221.36 and \$369.89.*