

Fact Sheet – Confidence Interval for an Unknown Population Proportion p (9.1)

In this section we learn to construct a confidence interval for an unknown population parameter (p) based upon the sample proportion (\hat{p}).

Example: A survey of 125 COS students shows that 30 own an iPhone. Construct a 95% confidence interval for the proportion of all COS students that own an iPhone.

Example: In a medical study, 80 patients were given a new allergy medication and 24 experienced headaches as a side effect. Construct a 90% confidence interval for the proportion of all allergy patients who experience headaches as a side effect of taking the new medication.

Example: A survey of 100 COS students shows that 55 are female. Construct a 99% confidence interval for the proportion of all COS students that are female.

Conditions

To construct a confidence interval for an unknown population proportion, p , the following three conditions must be met.

- The sample is independently obtained using simple random sampling or through a randomized experiment.
- $n\hat{p}(1-\hat{p}) \geq 10$
- $n \leq 5\%$ of N or $20n \leq N$

Margin of Error

$$E = z \cdot \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$

Lower Bound

$$\hat{p} - E$$

Upper Bound

$$\hat{p} + E$$

Interpretation

We are ___ % sure that the true population proportion p is between Lower Bound & Upper Bound.

StatCrunch Steps

- Stat > Proportions > One Sample > with summary
- Enter the number of successes & number of observations.
- Select the Confidence Level radio button and enter the level of confidence. Calculate.
- Round the lower bound and upper bound to 4 decimal places.