

Module 7b – Confidence Intervals (for means) (in practice)

[Review Against All Odds: Unit 24](#) (Confidence Intervals)

Confidence Intervals (continued)

The interval is formed by...

- Subtracting the margin of error from the mean.
- This is your ***LCL (Lower Confidence Limit)***
- Adding the margin of error to the mean.
- This is your ***UCL (Upper Confidence Limit)***

Confidence Intervals (assumptions)

Calculating a confidence interval requires making three assumptions.

1. The data are independent observations from a ***simple random sample***.
2. The distribution of the underlying population is ***relatively normal***.
3. We know the population ***standard deviation*** (or estimate it based on the sample standard deviation)

Confidence Intervals (practice)

Taken from Example 16.3 on page 381:

Calculating the average tip at a restaurant.

We randomly select 20 restaurant receipts out of all the receipts for an entire day.

Assume we know that the distribution of tips (as a percentage of the bill) is normally distributed with a **standard deviation of 2.0%**.

We calculate the mean tip percentage for the **sample of 20** to be **22.21%**. Now we want to calculate the **95% confidence interval** for tips at the restaurant.

Confidence Intervals (practice)

Mean: 22.21%

Standard Deviation: 2.0%

Number in our sample: 20

Z-value: 1.96

$$\bar{X} \pm 1.96 * \frac{s}{\sqrt{n}}$$

$$22.21 + / - 1.96 * [2.0 / \sqrt{20}]$$

$$22.21 + / - .8766$$

21.33 (LCL) to 23.09 (UCL)

We are 95% confident that the true mean percentage tip from all patrons at the restaurant is between 21.33% percent and 23.09%