Print

Practice: Comparing Intervals at Different Confidence Levels

You are developing a new lightweight lithium battery. The target weight is 22 g. You measure 10 batteries. The average weight is 22.2 g, and the standard deviation is 0.15 g.

Use the Confidence Interval for One Mean calculator for this practice.

1. Construct a 95% confidence interval for the mean weight. What is the 95% confidence interval? (**Hint**: Write down these values.)

   Hint: To find the script for the Confidence Interval for One Mean calculator, access **Help**, **Sample Data**, **Calculators**. In the pop-up box, select **Summary Statistics**. Change the interval type to **t**, and enter the values above.

   The 95% CI is 22.09 to 22.31.

2. From this sample, what can you conclude about the true mean battery weight?

   The 95% CI for the true battery weight is 22.09 to 22.31. The target weight is 22 g. This interval does not include the target weight: the lower bound of the interval is 22.09. Based on these data, you conclude that the average battery weight is above the target weight.

3. Construct a 90% confidence interval. What is this interval?

   The 90% CI is 22.11 to 22.29.

4. Construct a 99% confidence interval. What is this interval?

   The 99% CI is 22.04 to 22.35.

5. Compare and contrast these three intervals. What happens to the widths of the intervals as you change the percent confidence?

   The 99% CI is the widest, and the 90% interval is the narrowest. For the same data, higher confidence levels result in wider confidence intervals.

6. Suppose that instead of having a sample of 10 batteries you have 20 batteries. Construct a 95% confidence interval, and contrast this interval to the interval found in question 1. What happens to the width of the confidence interval if the sample size is 20 instead of 10? (Assume that you have the same sample mean and standard deviation.)

The confidence interval is 22.13 to 22.27. This interval is narrower than the 95% interval based on 10 observations. If you have a larger sample size, with the same mean and standard deviation, the confidence interval will be narrower.

Hide Solution

Close