In this example, you will learn how to test a claim about a proportion using Statdisk.

In a sample of 400 batteries, 50 of them are found to be defective. Use a significance level of 0.01 to test the claim that at most 10% of the batteries in the production run are defective.

Given the example from the module, we will use Statdisk to test the claim that at most 10% of the batteries in the production run are defective. This problem is a hypothesis test of a proportion with one sample.

We know it is a hypothesis test because we are asked to “test a claim”. We know it is not a claim about a mean because no mean is given.

We are given the numbers of defective batteries and the total number of batteries, which shows we can find the proportion of defective batteries so it is a claim about a proportion.

The claim indicates “at most” 10% so we can write that as $\leq 0.1$ to get the original claim, leading to greater than as the alternative hypothesis. Since the claim contains the equality, it will become our null hypothesis.

To solve this problem using Statdisk, open the “Analysis” tab, select “Hypothesis Testing”, and choose “Proportion One Sample”.
Now, we use our claim to select from the drop down menu. Our original claim was ≤, so we choose #2, and see that our claimed proportion is 10%.

(Note: Number 2 selected states: “Pop. Proportion < or = Claimed Proportion”.)
In this example, the level of significance is given as .01, the claimed proportion is given as .1, there are a total of 400 batteries, so n=400. Since 50 are defective, we can conclude that x=50.

(Note: all items stated below are highlighted in yellow on the screen.)
Once we select Evaluate, the results are given on the right. We are interested in either the critical value and test statistic if we prefer the traditional test of hypothesis, or else the P-value and significance level if we like the P-value test of hypothesis. In the traditional test we see that the test statistic does not fall outside of the critical value. In the P-value test we notice that the p-value is larger than the significance level.

(Note: The “Evaluate” button has a red arrow pointing to it and the following are highlighted in yellow: “Test Statistic, z: 1.6667”; “Critical z: 2.3264”; and “P-Value; 0.0478”.)
In either case, this tells us that we should fail to reject the null hypothesis, as is confirmed at the bottom of the output. Appropriate wording for the conclusion is that the sample does not provide sufficient evidence to reject the claim that at most 10% of the batteries are defective.

(Note: The “Evaluate” button has a red arrow pointing to it and the following are highlighted in yellow: “Fail to Reject the Null Hypotheses”; “Sample does not provide enough evidence to reject the class”.)