

Lab2: Z test for mean (population SD is known)

A manufacturer of a certain brand of 9-volt batteries claims that the average life of the battery is 40 hours when used in a radio, with a standard deviation of 5 hours. To test the manufacturer's claim, a random sample of 100 batteries was tested and it showed an average life of 38 hours. What can you conclude about the manufacturer's claim at a level of significance $\alpha = 0.05$? Calculate p – value. Solution:

Step 1: Setting up null and alternative hypothesis

Null hypothesis = $H_0: \mu = 40$ (The mean average life of batteries is 40hrs)

Alternative hypothesis = $H_1: \mu \neq 40$ (The mean average life of batteries is 40hrs)

<u>Z-Value</u>	<u>P-Value</u>
-4.00	0.000

Descriptive Statistics

<u>N</u>	<u>Mean</u>	<u>SE Mean</u>	<u>95% CI for μ</u>
100	38.000	0.500	(37.020, 38.980)

μ : mean of Sample

Known standard deviation = 5

Conclusion: Since p-value = 0.000 < $\alpha = 0.05$, we strongly reject H_0 at 5% level of significance. Since, sample mean is 38 hours and the test is significant, we can conclude that the average life of batteries is significantly lower than 40 hrs. Hence the manufacturer claim is not valid.

Further there is 95% chance that the population mean is between 37.02 hours to 38.98 hrs.