Answer on Question #42086-Physics-Other

A special cable has a breaking strength of 800 lbs. The standard deviation of the population is 14 lbs. A researcher selects a sample of 36 cables and finds that the average breaking strength is 794 lbs. Can one reject the claim that the breaking strength is 800 lbs? Find the P-value. Should H0 be rejected at α= 0.01? Assume that the variable is normally distributed.

Solution

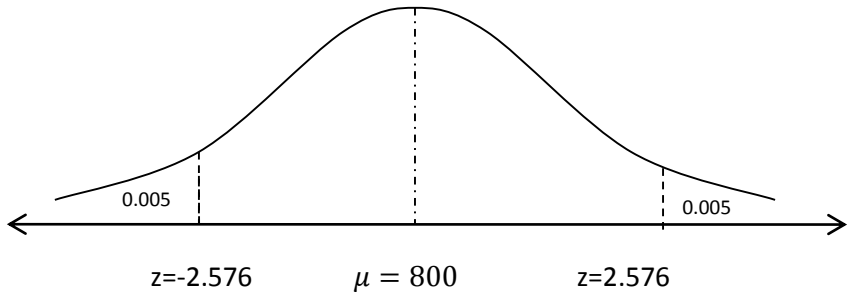
Step 1. State H_o: $\mu = 800$, H_1: $\mu \neq 800$.

Step 2. Type of test two-tailed test.

Step 3. Level of significance: $\alpha = 0.01$.

Step 4. Critical value of the statistic: $z = \pm 2.576$.

Step 5. Diagram



Step 6. Decision rule: Reject H_o if z computed from evidence is < -2.576 or >2.576 or if p-value<0.01.

Step 7. Compute the statistic

Evidence: $n = 36$, $\bar{x} = 794$, $\sigma = 14$

$$z = \frac{\bar{x} - \mu}{\frac{\sigma}{\sqrt{n}}} = \frac{794 - 800}{\frac{14}{\sqrt{36}}} = -2.571.$$

Compute the p-value: the two-tailed p-value equals 0.0101>0.01.

Step 8. Conclusion: do not Reject H_o. We have statistical evidence at a 0.01 level of significance to believe that the evidence is in line with the claim that the breaking strength is 800 lbs.