Semester : 4 Subject : Statistics for AIDS Academic Year: 2023 2024.

Example1:
A company manufactures car batteries with an average life span of 2 or more years. An engineer believes this value to be less. Using 10 samples, he measures the average life span to be 1.8 years with a standard deviation of 0.15.

(a) State the null and alternate hypothesis.

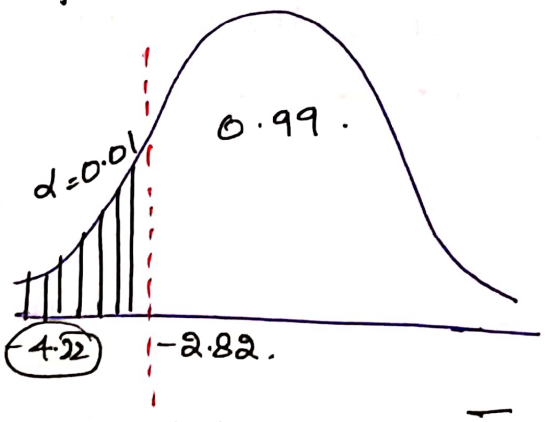
(b) At a 99% confidence level is there enough evidence to discard the null hypothesis?

Solution:

$H_0 : \mu \geq 2$

$H_1 : \mu < 2$

Since in alternate hypothesis $\mu < 2$, we choose left tailed test:




Confidence level = 99%

$C = 0.99$

$\alpha = 1 - 0.99 = 0.01$.

Since the sample no = 10; we use t-test.

Given data: $n = 10$, $\bar{x} = 1.8$, $s = 0.15$, $\mu = 2$.

Degree of freedom $= n - 1$

$= 10 - 1 = 9$.

$t = 2.8214$

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$$t = \frac{\bar{x} - \mu_0}{s/\sqrt{n}}$$

$$= \frac{1.8 - 2}{0.15/\sqrt{10}} \quad = \frac{-0.2}{0.047}$$

$$\boxed{t = -4.22}$$

Calculated $t = -4.22 < -2.82$

We reject the null hypothesis.

Yes there are enough evidence to discard the null hypothesis.

Example2:

If the sample mean and expected mean value of the marks obtained by 15 students in a class test is 290 and 300 respectively. What is the t-score if the sd of the marks is 50? ($\alpha = 1.761$).