

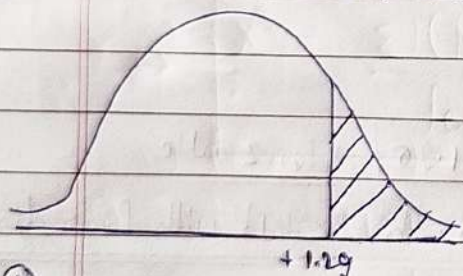
- Assignment - 1) A car company believes that the % of residents in city ABC that own a vehicle is 60% or less. A sales manager disagrees with this. He conducts a hypothesis testing surveying 250 residents & found that 170 responded yes to owning a vehicle.
- ① State the Null & Alternate Hypothesis
- ② At 10% significance level, is there enough evidence to support the idea that vehicle ownership in City ABC 60% or less?

Ans. \Rightarrow Here, $n = 250$ & $x = 170$

- ① Null Hypothesis : $H_0 = P_0 = 60\%$ \therefore This is 1 Tail Test
 Alternate Hypothesis : $H_1 = P_0 < 60\%$

② $\hat{p} = \frac{x}{n} = \frac{170}{250} = 0.68$ & $q_0 = 1 - P_0 = 1 - 0.60 = 0.40$

- ③ $\alpha = 10\% = 0.1$; C.I. = 90% & $[1 - 0.1 = 0.9]$ Here we go with Z-Test with Proportions

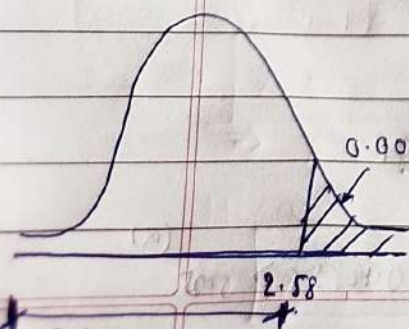


For Value 0.9 \Rightarrow Z-score = +1.29
 from Z-Table

④ \therefore Z-Test = $\frac{\hat{p} - P_0}{\sqrt{\frac{P_0 q_0}{n}}} = \frac{0.68 - 0.60}{\sqrt{\frac{0.60 \times 0.40}{250}}} = \frac{0.08}{\sqrt{\frac{0.24}{250}}} = \frac{0.08}{\sqrt{0.00096}}$

\Rightarrow Z-Test = 2.588 $\therefore 2.58 > 1.29 \therefore$ Reject the Null Hypothesis

* P-value \Rightarrow Here, for $Z = 2.588$ from Z-Table, \Rightarrow $Z_{0.99506} = 2.588$



$\therefore 1 - 0.99506 = \text{P-value}$
 \Rightarrow P-value = 0.00494

$\Rightarrow \therefore$ P-value < Significance level \therefore Reject the Null Hypothesis