Stat-Assignment - 9th July

8) A Car company believes that the percentage of residents is city ABC that owns 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.

a) State the null & alternate hypothesis

b) At 10% significance level, is there enough evidence to support the idea that vehicle ownership in city ABC is 60% or less

Ans: i) Null & Alternate hypothesis:

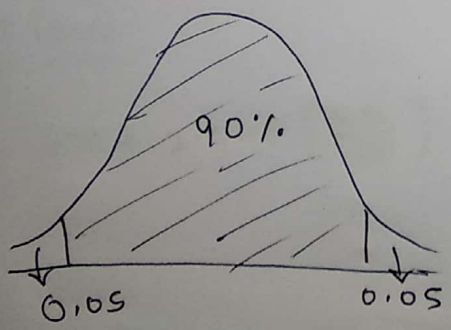
$$H_0 \Rightarrow P_0 = 60\% = 0.6$$

$$H_1 \Rightarrow P_0 \neq 60\%$$

$n = 250$

$\bar{x} = 170$

ii) $\alpha = 10\% = 0.1$



$1 - 0.05 = 0.95$

Zscore = 1.65 (By refering z-table).

iii) Decision rule = $\begin{Bmatrix} < -1.65 \\ > 1.65 \end{Bmatrix}$

iv) $\underline{z\text{-test}} = \dfrac{\hat{P} - P_0}{\sqrt{\dfrac{P_0 \times q_0}{n}}}$

$\hat{P} = \dfrac{x}{n} = \dfrac{170}{250} = 0.68$

$q_0 = 1 - P_0 = 1 - 0.60 = 0.40$

$\therefore$ z-test $= \dfrac{0.68 - 0.60}{\sqrt{\dfrac{0.60 \times 0.4}{250}}}$

z-test $= 2.58$

$2.58 > 1.65$ → the null hypothesis is rejected.