Question 3)

A car company believes that the percentage of citizens in city ABC that owns a vehicle is 60% or less. A sales manager disagrees with it. He conducted a hypothesis testing surveying 250 residents and found that 170 residents responded Yes to owning vehicle.

a) State the null and Alternate hypothesis

b) At a 10% significance level, is there enough evidence to support the idea that vehicles owner in ABC is 60% or less

$n = 250$

$x = 170$ (People who said YES)

$\alpha = 0.1$

Step ① :- Null hypothesis $H_0 \Rightarrow P_0 \leq 60\%$

Alternate hypothesis $H_1 \Rightarrow P_0 > 60\%$

Step ② : $\alpha = 0.1$

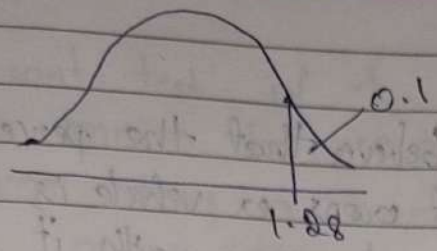
$q_0 = 1 - P_0$

$= 1 - 0.6 = 0.4$

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

Z-test with Proportion: $\frac{\hat{P} - P_0}{\sqrt{\frac{P_0 \times q_0}{n}}}$

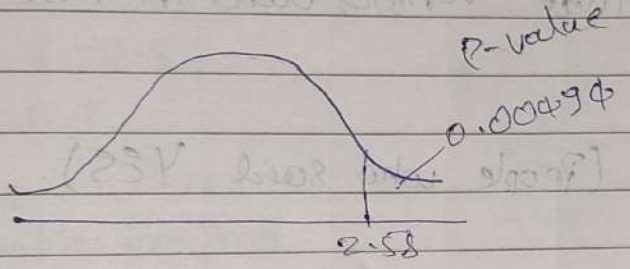
$\Rightarrow \frac{0.68 - 0.6}{\sqrt{\frac{0.6 \times 0.4}{250}}} = 2.580$



$2.580 > 1.28$

So we reject the Null hypothesis, concluded more than 60% vehicle ownership is possible.

With P-value:-



0.99506 is area for $Z = 2.58$

$1 - 0.99506 = 0.00494$

$0.00494 < \alpha$ value

$0.00494 < 0.1$

So we reject the Null Hypothesis.